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## ORIGINAL ARTICLES

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### ESSENTIAL FACTORS IN THE USE OF MODELING COMPOUND AS AN IMPRESSION MATERIAL FOR THE ORTHODONTIST\*

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ACCURATE models of the teeth and their adjacent tissues are as important to the orthodontist as to any other practitioner of dentistry who is compelled to reproduce in artificial form these structures in the same size and relationship as they exist in the mouth. Such models can of necessity only be produced from impressions in which the material has been in even contact with all parts to be reproduced and can be removed from this relationship in such a state that the mould produced truly and accurately represents the original.

Owing to the irregular arrangement of the teeth as well as the various degrees of malformation of the adjacent alveolar structures found in the majority of cases of malocclusion, it has been commonly taught that plaster of paris is the only material which can be made to fully meet the requirements of an impression material for the orthodontist. This idea has become so firmly fixed in the minds of many that they look with disapproval upon the use of other materials. Their arguments and protestations might have more weight were it not for the fact that men in other branches of dentistry requiring equally if not more accurate models than the orthodontist, have turned to the other materials without loss of accuracy or without loss of efficiency in

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\*Read before the June Meeting of the Southern California Section of the Pacific Coast Society of Orthodontists.

their final results. The writer refers to the use by prosthetists of modeling compound.

While the belief among this class of operators shows a variance of opinion, a sufficiently large number of well-known men have demonstrated its advantages by their results in practice so that its fitness is no longer questioned. If this is true in a field where the degree of accuracy of the impression governs to a large extent the success of the finished product, is the orthodontist illogical who seeks to make this material fulfill his needs? Surely not, if it has advantages of special significance to him in his work and it is the opinion of the writer that we may with all justice so regard modeling compound.

That plaster of paris is not a pleasant material to use in the mouth must be admitted by all. *Inasmuch as the orthodontist is dealing almost entirely with young children and as the obtaining of impressions is usually one of the first procedures of treatment, it would seem logical, all other things being*

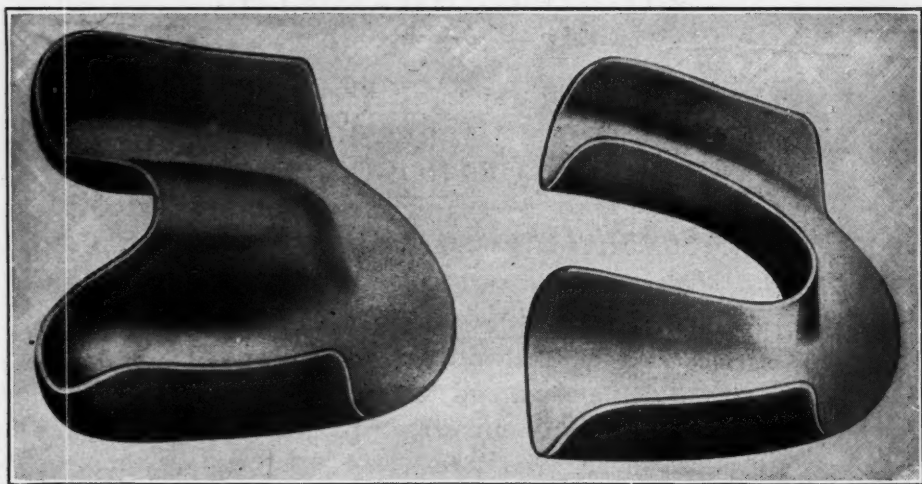


Fig. 1.—Impression trays especially adapted for the use of modeling compound. No attempt has been made by the designers to patent this or other appliances developed by them as they do not believe it to be in keeping with true ethics of dentistry to do so.

*equal that the least objectionable means possible should be employed for this work.*

If any practitioner will go to the trouble of taking two sets of impressions of several children's mouths, using plaster of paris for one and modeling compound for the other, and will then ask each child which was the least unpleasant, he will find that modeling compound will receive the vast majority of votes. This fact alone should be sufficient to elicit the interest of the orthodontist in this material and stimulate his desire to master a technic which will make possible its more frequent use.

It has still another advantage which is worthy of mention, namely, after the impressions are obtained the work of making the model is rendered far less laborious and difficult than where plaster is used for the impression material. Most busy orthodontists do not attempt to pour, separate, and trim their own models but have this phase of the work done by the assistant,

and it will be found that the average assistant will handle model work better, more expeditiously, and with vastly less effort when this material is used in preference to plaster.

One of the chief causes of prejudice against modeling compound as an

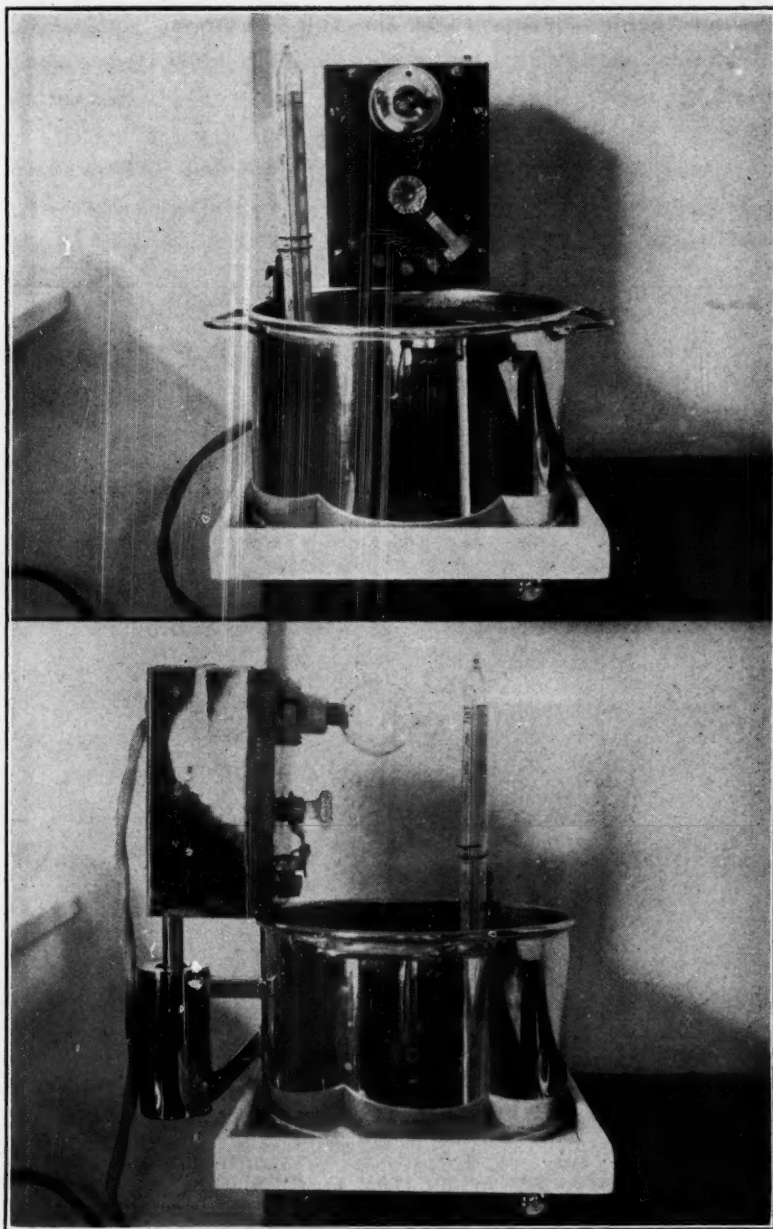


Fig. 2.—Apparatus for heating modeling compound, consisting of an electrical heating unit connected with a water vessel. The electrical unit is immersed in a separate chamber from that in which the compound is heated. This apparatus was designed by Dr. George M. Hollenbach.

impression material for the orthodontist is due to the fact that in many instances where it has been employed, *the technic used was not favorable to successful results because the peculiar requirements imposed by maloccluding teeth were not taken into consideration.* Consequently the models produced



under such conditions frequently showed distorted teeth and other evidences of inaccuracy and therefore were well deserving of the condemnation they received.

Such shortcomings however are not necessary provided proper methods are employed. In outlining a technic, the author ventures the opinion that anyone who is willing to carry out the suggestions in detail will after a little experience be gratified with the results. The most important factors of this technic may be enumerated as follows:

First, the use of a suitable tray.

Second, the proper preparation of the impression material.

Third, the careful handling of the material while in the act of taking the impression.

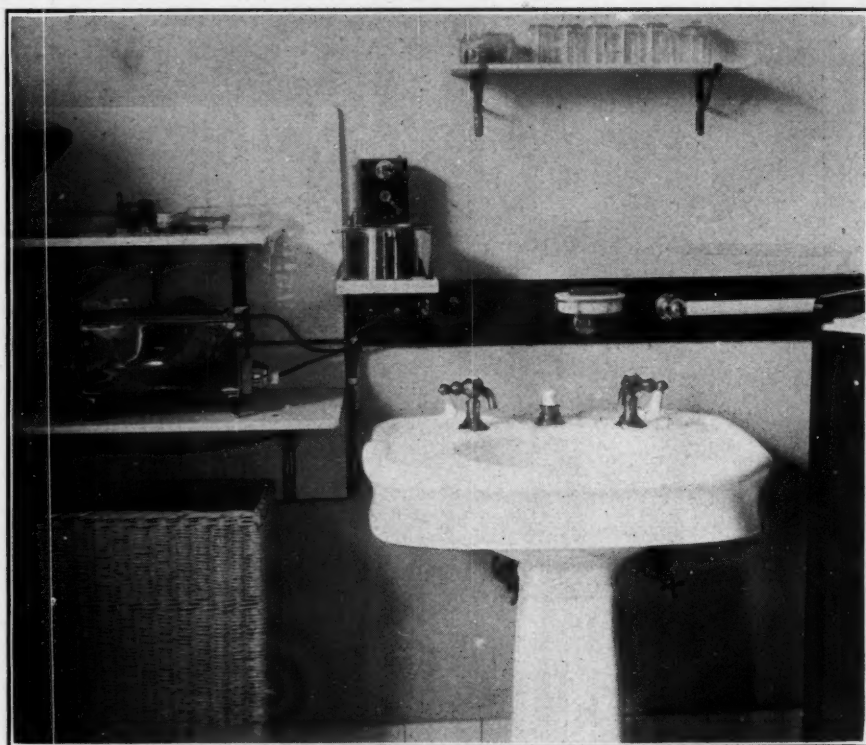


Fig. 3.—It is advantageous to have the heating apparatus placed within easy reach of the operator. This shows the plan utilized by the writer.

#### THE USE OF A SUITABLE TRAY

The ordinary plaster impression tray is quite unsuited to modeling compound and should never be used with this material. For this purpose, after considerable experience in trying various trays, the writer and his associate, Dr. J. R. McCoy, finally developed the impression trays shown in Fig. 1. They are made of aluminum and are not supplied with a handle of any sort. The sides are high but the front portion is cut out sufficiently so that when the tray is put in the mouth, the sides will only extend forward to a point just posterior to the canine eminence. When placed in the mouth, such a tray will bring the modeling compound under pressure in contact with all



portions of the dental arch except the labial area which corresponds to the cut-out section of the tray. This portion is obtained subsequently after the impression of the balance of the arch has been secured as will be explained later on.

#### THE PROPER PREPARATION OF THE IMPRESSION MATERIAL

The proper preparation of the impression material constitutes one of the most important steps in the use of this method and careful attention to this phase of the work will soon become apparent in the finished impression. *In order to get satisfactory results from the use of modeling compound, it must be properly heated and manipulated. This necessitates the use of water heated as uniformly as possible, with the temperature judged by means of an accurate thermometer.*

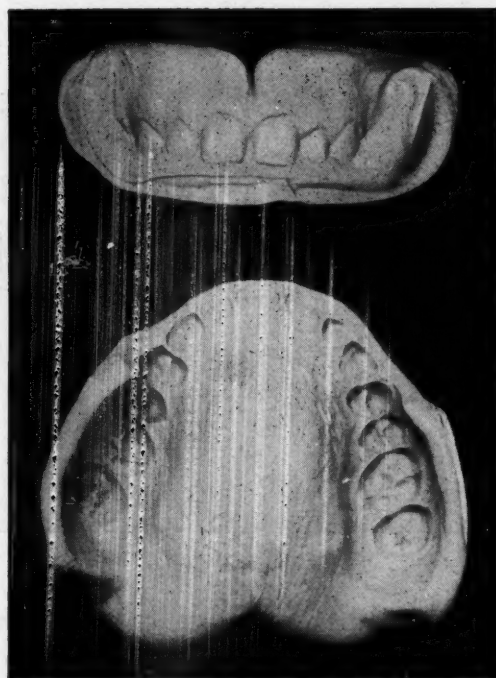


Fig. 4.—This shows the main portion of the impression after it has been cut back. It also shows the labial section which has been made with the main portion in place upon the teeth.

Perhaps the most convenient manner of heating the water is obtained by the use of an electrical heating unit, several types of which are available. The author has found the apparatus shown in Figs. 2 and 3 to offer decided advantages over anything else coming under his observation and experience. It consists of an electrical heating unit connected with a water vessel holding approximately one quart. The electrical unit is immersed in a separate chamber from that in which the compound is heated, which provides among other things a circulation of the hot water in such a manner as to favor a more even degree of heat between the top and bottom of the solution.

The resistance in the heating unit is controlled by a little rheostat and the temperature of the water is judged by the use of an accurate thermometer as shown in Fig. 2. At the bottom of the heating vessel, a smooth porcelain

dish is provided to keep the compound from sticking to the metallic dish during the process. This may be easily removed and cleaned if the material adheres to it.

The impression material is placed in the water with the temperature at the bottom of the vessel as registered by the thermometer at 130° Fahrenheit.\* As soon as it is softened it is removed by the assistant and manipulated, being placed back in the water as frequently as is necessary. The surface water is always from five to ten degrees hotter than the water at the bottom of the dish so that as the compound is carried through it, its softening is hastened by this greater heat. When reduced to a soft pliable state, it is placed in the impression tray, care being exercised not to use more than enough to evenly fill the tray, as an excess of material will prove a hindrance rather than an advantage. The filled tray is then placed over a Bunson flame for an instant, the surface compound being exposed to the heat, is re-dipped into the water of the heating vessel, and is then carried to place in the mouth.

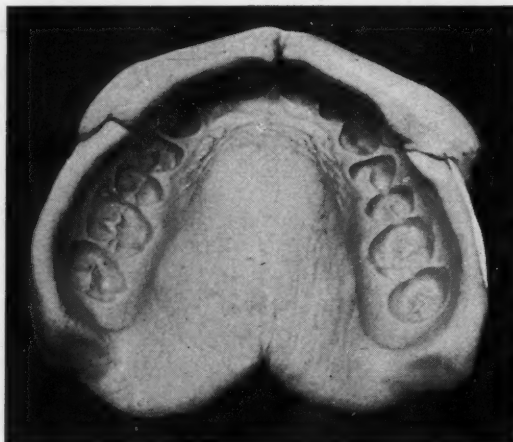


Fig. 5.—The completed upper impression.

#### HANDLING THE MATERIAL DURING THE ACT OF TAKING THE IMPRESSION

When the tray with its contents has been brought to the desired position in the mouth, *it should be held firmly in place until the compound can be chilled.* This may be accomplished either through the use of compressed air, or cold water directed against the tray from a suitable syringe. This latter method is preferable but if used, a saliva ejector must be employed to carry away the water. *Under no circumstances should an attempt be made to remove the tray from the mouth until the material has been thoroughly chilled.* When this has been accomplished, the tray with its contents is worked off of the teeth, care being exercised to remove it evenly from all parts of the mouth rather than to pry it away from the front, sides or back.

By carrying out the preceding details (in the case of the maxillary arch) an accurate impression is obtained of all areas with the exception of the labial portion lying between and usually including the canine teeth. Upon

\*The temperature to be used must of necessity depend upon the product used. Different manufacturers specify the degree of heat giving the best results with their individual products and their instructions should be followed.

the removal of the impression, the borders of this inaccurate portion are cut back with a sharp knife to a point where the impression is good, a sharp line of demarcation being made. In making this cut, it is well to start at one side cutting from the top to the bottom and following along the incisal edges of the canines and incisors. See Fig. 4. It is important that the posterior part of this cut-out portion of the impression should extend backward at least beyond the canine eminence. If this is not done, the impression will bind and pinch the tissues when it is put back in the mouth for the addition of the labial section.

When the necessary trimming has been completed, the impression is slipped back in the mouth and should go to place without any discomfort. While being held firmly with the index finger of the left hand pressed against the vault of the tray, the upper lip is lifted and a small amount of the compound is adapted against the anterior portion of the arch, the lip

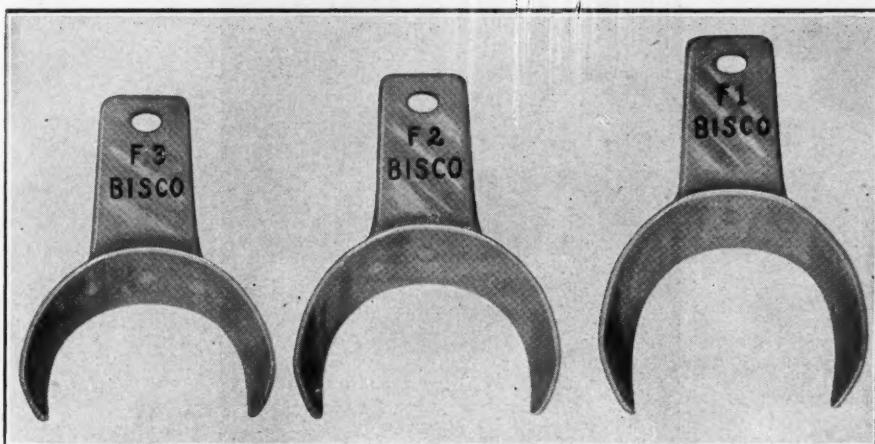


Fig. 6.—Impression trays for closed bite study models.

being lifted for this purpose. This done, the lip is then allowed to come in contact with the impression material and gently massaged against it to insure even contact against the alveolar structures and teeth. This portion of the material is then thoroughly chilled with compressed air or cold water. This accomplished, it is then removed separately from the main impression after which the tray and main impression are taken out. See Fig. 4.

These two sections of the impression are then fitted together and if the work has been properly carried out will go together and show no overlapping edges. When the proper relationship is established, the modeling compound should be fused at several points with a hot instrument so that the union may be permanent. Fig. 5.

The same procedure is carried out in taking the impression of the mandibular arch. This is usually accomplished with less difficulty than is encountered with the maxillary arch and for this reason the temptation often arises to take the impression all at one time rather than resort to the sectional method. This should not be attempted as it will almost invariably



bring about inaccurate results which will be chiefly characterized by distorted impressions of the anterior teeth.

While impressions of the majority of cases may be obtained through the use of the trays already described, there is always the possibility of cases occurring in which the character of the deformity may require that the impression be taken in more than two sections. Such cases can still be taken in modeling compound by using a "Supplee Tray" and making the impression in three or more sections or if need be in these rare cases, plaster of paris may be resorted to.

The writer has already mentioned the element of time in using this mate-

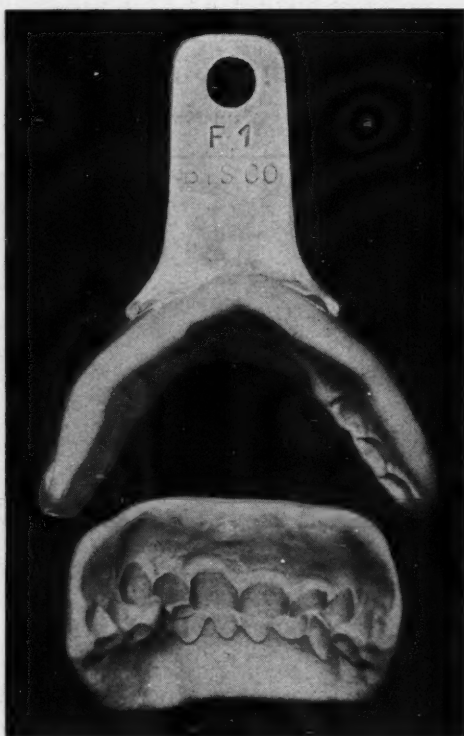


Fig. 7.—Two aspects of a study model impression.

rial. The actual time spent in taking a compound impression using this technic probably exceeds that which is necessary when plaster of paris is used but even so, the matter of time is not a serious consideration as this technic may be carried out to the very letter and satisfactory impressions obtained of both the maxillary and mandibular arches with the total amount of time spent not exceeding fifteen minutes.

In preparing such impressions for pouring, they should first be thoroughly dried out either by compressed air or by allowing them to stand a sufficient length of time, so that all surface dampness is removed and then they should be given a light coat of very thin sandarac varnish. This varnishing is not done with the idea of acting as a separating medium but simply as a means of insuring a better finish to the model surface. After the varnish

has become thoroughly hardened, the model is poured in the usual way, care being taken to avoid the formation of air bubbles.

#### IMPRESSIONS FOR STUDY MODELS

In addition to making separate impressions of the maxillary and mandibular teeth and arches as already described, modeling compound can be used very advantageously in taking impressions for closed bite "study models." The indications for such models occur quite frequently in the practice of any orthodontist, they being especially indicated in those cases where

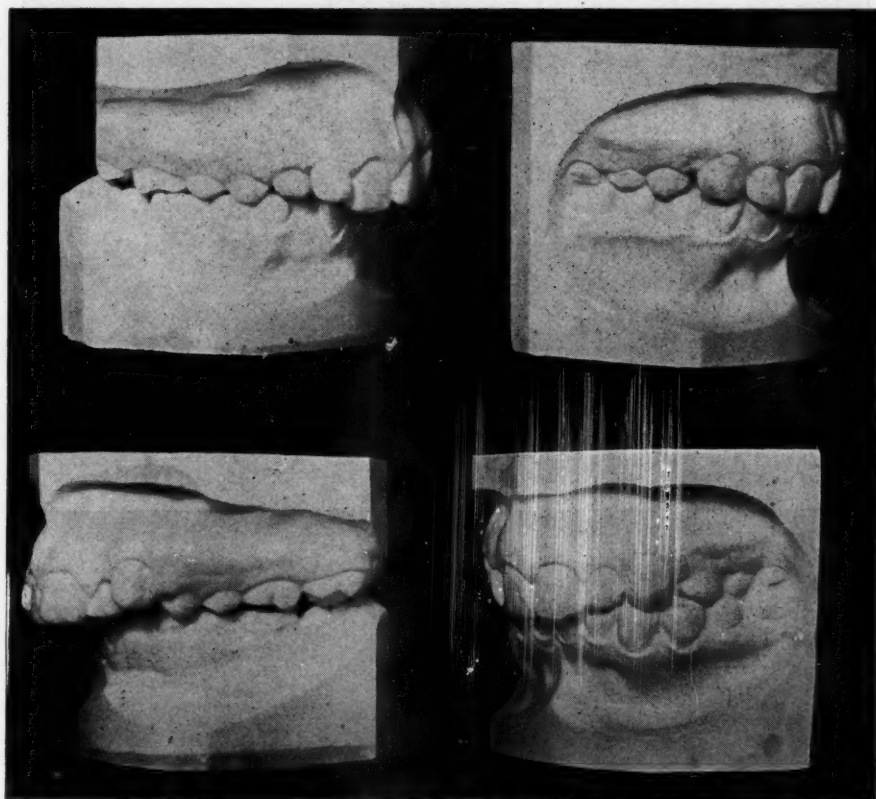


Fig. 8.—On the right are shown progress models made from the impression shown in Fig. 7. These show the results of seven months' treatment.

it is desirable to record degrees of progress in treatment, cases under observation, cases under retention, etc.

In order to render more accurate the taking of such impressions, the author has designed a set of trays shown in Fig. 6. A small amount of the modeling compound is adapted against the tray, care being exercised not to allow it to extend appreciably over the edge of the tray or to be more than one-fourth of an inch in thickness. The patient is instructed to close the teeth in their natural resting occlusion and the tray is inserted and pressed against the teeth, the lips being parted for this purpose. The tray with its contents is held firmly in position until the material has become chilled. The patient is then instructed to open the jaws slightly and the impression is removed from the mouth. In Fig. 7, two aspects of such an impression are

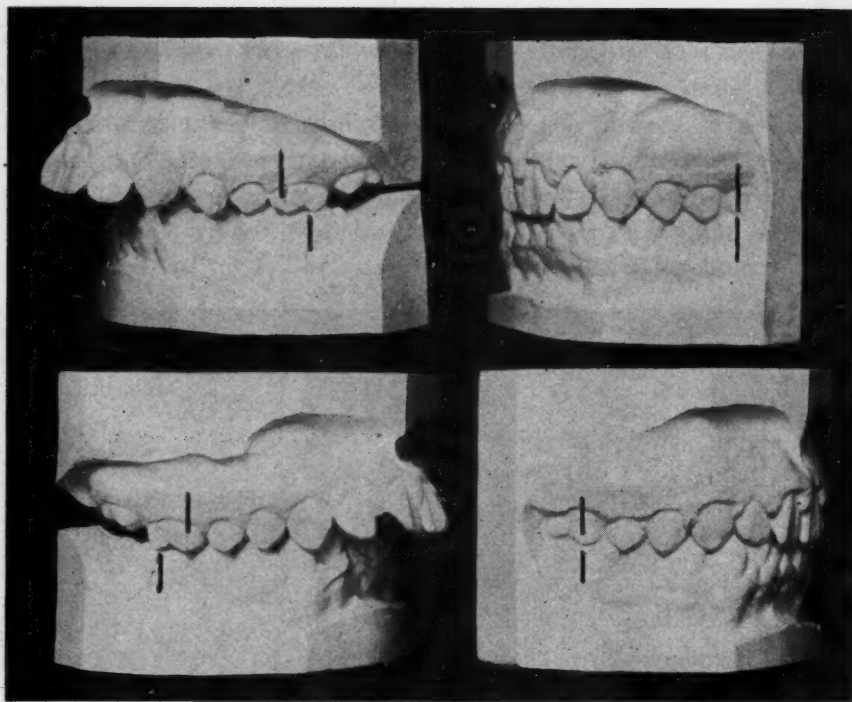


Fig. 9.—The models on the right are progress models showing the results of six months' treatment.

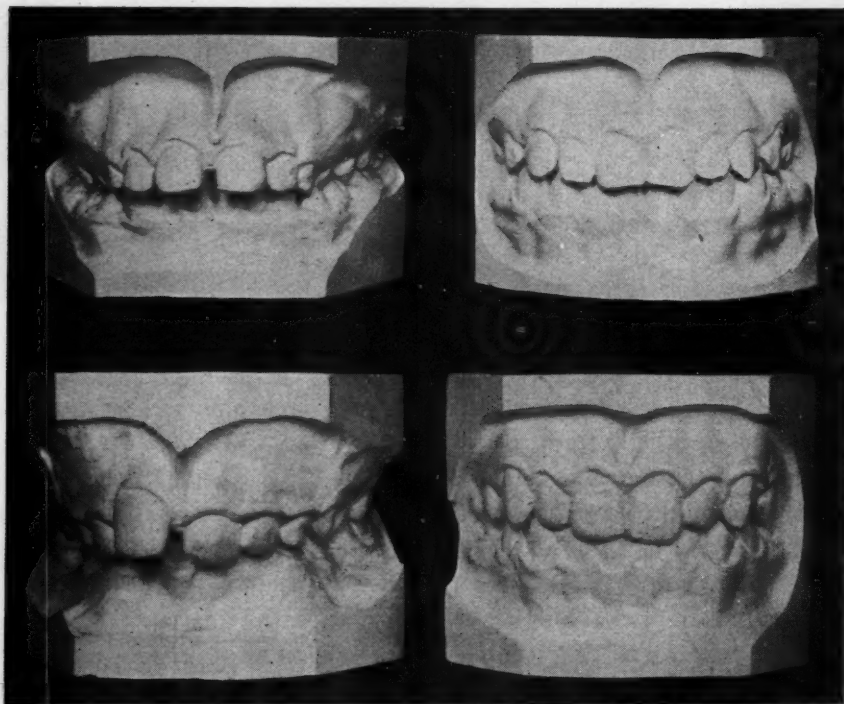


Fig. 10.—Two cases before and after treatment, the models on the right having been made by the closed bite method after all appliances had been removed.



shown, and in Fig. 8, the progress models made from this impression, show the results of seven months of treatment.

In designing the trays, three sizes have been provided which in the author's experience have very satisfactorily fulfilled the needs of different mouths. In the event a study model is desired which will show the relationship of the occluded teeth from molar to molar, the largest size should be employed or should a lesser area only be desired, a shorter tray will suffice. The handle upon the tray adds materially in properly centering the material about the teeth. It is also a valuable aid when such impressions are poured in guiding the technician in distributing the plaster base. Other examples of models made after this plan are shown in Figs. 9 and 10.

In conclusion, the author heartily recommends modeling compound as an impression material for the orthodontist. This is not done upon superficial experience but after using it constantly for ten years. Those who will go to the trouble of giving it a fair trial, which means using it under proper conditions with strict observance of the various rules governing its use, will find it advantageous; first, because it is less objectionable to our little patients than is plaster of paris; second, because it renders the process of model construction less irksome to the assistant; and third, because with it, beautiful and accurate impressions may be obtained.

## SOME TYPES OF THE FINGER-SPRING USED ON THE LINGUAL BASE-WIRE\*

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FINGER-SPRINGS have been employed a great many years by Doctor Victor Hugo Jackson as a part of his system of appliances. They have also become an important part of lingual wires both of the soldered and removable type.

The soldered lingual wire when employed with the wire-stretching pliers can be made more efficient in certain types of malocclusion by the employment of the finger-spring.

Fig. 1 shows a soldered lingual wire which has been used for producing expansion of the lateral halves of the arch. As the case progressed the lingual wire in the incisal region was pinched practically as much as it would stand, but the deciduous canines were not moved sufficiently and small finger-springs had to be soldered to the base-wire to produce expansion in the canine region. In adjusting these finger-springs to exert force on the canines, the lingual base-wire can be raised slightly occlusally while the finger-springs are adjusted. The elasticity of the base-wire will bring it back to the normal position.

In raising the base-wire occlusally in adjusting the finger-springs, the base-wire must not be sprung beyond the range of elasticity or it will not go back to its proper position. If it does not resume the proper position after the finger-springs have been adjusted, the efficiency of the appliance will be lost.

Fig. 2 shows an appliance constructed on a model. We have employed the solder base-wire and finger-spring. This case was complicated by three supernumerary teeth, an impacted first maxillary incisor and transversion of the canine and second maxillary incisor on the right side. Our plan of treatment was to move the left second incisor forward and create space for the canine. The right first and second incisors were to be placed in the line of the arch in positions of transversion because the roots of the teeth were displaced as much as the crown, and two supernumerary teeth were impacted in the triangular space between the right anterior teeth. The movement of the teeth mentioned, was preliminary treatment and started to produce a normal development in the anterior region of the arch.

We believed that this development and movement could best be accomplished by the use of the finger-springs with the least annoyance to the patient, realizing, of course, the appliance would necessitate several changes

\*Read before the second meeting of New York Society of Orthodontists, February 8, 1922.

before the case was finished. It will be observed that the finger-spring on the left second incisor contains a loop which can be bent or closed to control the radius of the circle in which the second incisor travels in its forward movement toward the median line.

The finger-spring on the right second incisor is also shaped so the tooth can be moved buccally and distally by controlling the bends that are in the anterior end of the finger spring.

Fig. 3, when studied in conjunction with Fig. 2, shows the construction of the finger-spring which rested against the canine to move the tooth forward and labially. This finger-spring was made of a wire of two dimensions; i.e., a piece of 18 gauge wire was soldered to the molar band which extended forward to the anterior surface of the first premolar. This 18



Fig. 1.



Fig. 2.

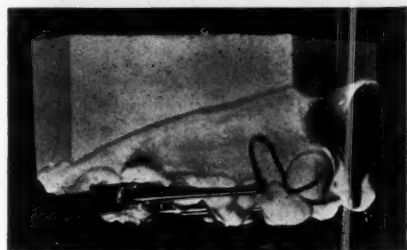


Fig. 3.



Fig. 4.

gauge wire was used to give rigidity and to prevent the displacement of the finger-spring that pressed against the canine. The loop of the finger-spring was made of 21 gauge wire and could be controlled so as to move the canine in the two directions mentioned; namely forward and lingually.

In adjusting these finger-springs which are attached to soldered lingual wires the operator must have mastered the technic of bending wire or the pressure will not be exerted in the direction he desires. Owing to the trouble that some have encountered in adjusting finger-springs which are attached to soldered lingual wires, the use of the removable type in conjunction with finger-springs has become quite popular.

Fig. 4 shows such an appliance as designed by Dr. L. J. Porter. It will be seen that the lingual base wire is only in contact with the molars, and directly exerts pressure on them. The pressure which is applied to the other



teeth is derived from finger-springs. It is an advantage to have a finger-spring which is delicate enough to exert only sufficient pressure to produce cell-activity and have the elasticity of the finger-spring sufficient to extend over a considerable range of movement. In attempting to use a long elastic finger-spring on the deciduous molars and canines as shown in Fig. 4, there is a tendency for the finger-spring because of its elasticity, to slide occlusally along the lingual surface of the canine. To prevent this, an extension hook has been soldered on the base-wire to engage the finger-spring and thereby make the finger-spring maintain a fixed position in relation to the anterior portion of the lingual base-wire.

It must be remembered that if the finger-spring is too stiff when held in position by this lingual extension hook, it will still slide occlusally, which of course has a tendency to tip the molars posteriorly. It is necessary that the lingual finger-spring which exerts pressure on the canine and premolar must not be strong enough to displace the molar anchorage. In constructing finger-springs as shown in Fig. 4, on premolars and canines, some have ad-

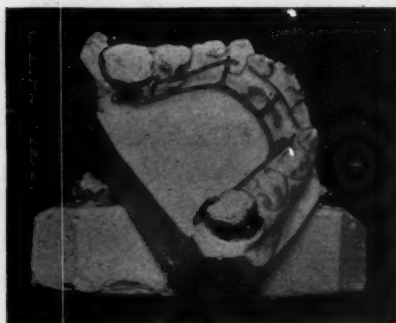


Fig. 5.



Fig. 6.

vised that the finger-springs should be heavier in the portion that is soldered to the lingual base-wire.

In carrying out this construction, some have made finger-springs from 18 gauge wire and then ground and tapered them down until the wire was of 21 or 22 gauge in the region of the canine and the first deciduous molar. This construction is more difficult to make but gives a finger-spring which withstands the stress of mastication to a much better degree than if the entire length of the wire is made of 21 or 22 gauge.

Fig. 5, in conjunction with Fig. 4 shows the use of a type of finger-spring on the incisors which we have termed "T-bar." The use of the "T-bar" on incisors having malpositions similar to those shown in Figs. 4 and 5, have proved very efficient. This efficiency reaches a higher degree by constructing the perpendicular portion of the T-bar from 19 gauge iridio-platinum. The upright portion of the T-bar which is made of iridio-platinum, can be successfully manipulated with the wire-stretching pliers in such a manner as to increase its length causing the horizontal portion, which is of 21 or 22 gauge wire, to press against the lingual surface of the incisors and the horizontal part of the T-bar is given the shape which the malocclusion

of the teeth makes necessary. The spring-wire portion or the horizontal portion of the T-bar must rest against the least curved portion of the lingual plane which tends to displace the appliance.

In using finger-springs on removable lingual arches, some have placed the finger-spring gingivally to the base-wire. This plan of construction subjects the finger-spring to less danger of injury from mastication because the finger-spring is protected by the 18 gauge base-wire. Such a construction is shown in Fig. 6, which is a case that required expansion in the canine region and a labial movement of the left second incisor which is just erupting. The finger-springs pressing against the canines differ slightly in shape, and the one on the right side would be the most efficient if a slight posterior movement of the canine was desired, along with the buccal expansion. The finger-spring which engages the right second incisor has the end of the spring bent at right angles so the perpendicular portion of the finger-spring slips under the gum and engages the lingual surface of the incisor that is



Fig. 7.



Fig. 8.

erupting. This construction is very efficient in the type of case which is illustrated in Fig. 6.

The types of finger-springs which we have considered so far have been those which possess only a single action or one center of rotation. Fig. 7 shows a double finger-spring or loop finger-spring which has been employed by many men. It is supposed to possess the advantage of having a double center of rotation or double action and is often employed to exert pressure on two or more teeth. In Fig. 7, the finger-spring is so constructed as to exert pressure on the first and second incisor. In fact this finger-spring is a double affair and really possesses two centers of rotation. The portion of the finger-spring extending from the lingual base wire to the first incisor exerts pressure on the first incisor with the soldered attachment at the lingual base wire as a center of rotation. The recurved portion of this finger-spring in the region of the central becomes the central of rotation around which the lateral moves. Of course, in adjusting this type of finger-spring there must be two adjustments or the adjustment of the two arms of the finger-spring, so as to exert pressure respectively on the first and second incisor. As the second incisor moves outward, the loop must be bent to a greater

extent and as the central moves outward the finger-spring must be swung labially at the point where it is soldered to the lingual wire.

It will be noticed that a finger-spring for expansion extends from the lingual base-wire in the region anterior to the molar to the first premolar and the end of this finger-spring is bent buccally to engage the first premolar gingivally to the mesial contact point. By having this lingual finger-spring bent buccally to grasp the surface of the tooth as described, it acts as a stabilizer to the molar anchorage. The molar cannot tip posteriorly without the elongation of the first premolar. In order that this finger-spring may act as a stabilizer to the molar anchorage, it must be made heavier than the finger-springs which are used for the incisors. This premolar finger-spring when used for anchorage as well as expansion, should be made of 18 gauge wire, which can be slightly ground to reduce the bulk and increase the elasticity. It should be ground only on the buccal or lingual side so as to allow the full width of the wire occluso-lingually. If constructed in this manner the premolar finger-spring will eliminate the trouble many men have encountered by having the lingual appliance slide occlusally on the incisors and the molars tipping posteriorly.

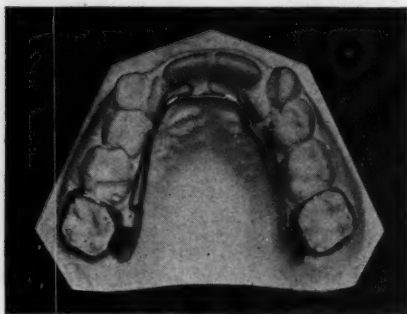


Fig. 9.



Fig. 10.

Fig. 8 shows a case with a similar appliance as shown in Fig. 7. However, in Fig. 8, the lingual base wire has been placed gingivally, to a great degree, to have as little appliance as possible in the incisal region and allow free space for the tongue during speech. In such a construction as we have in Fig. 8, as the treatment progresses, it will be necessary to reconstruct the appliance, for the incisors and premolars will eventually be moved so far away from their original position that the base-wire will be too small and a new base-wire will have to be made either by reconstructing the appliance entirely or by setting a piece of wire in the incisal region so as to increase the length and width of the lingual base-wire.

Fig. 9 shows an appliance designed by Dr. Porter in which the recurved or looped finger-springs have been employed on the incisors and finger-springs also exert pressure on the deciduous molars, to widen the arch in the premolar region. With this case, as well as the other, it will probably be necessary to reconstruct the appliance before the work is completed.

One of the great advantages of finger-springs is that they can be employed to exert pressure on teeth that are only partially erupted. Such a



use is shown in Fig. 10, where we have a badly complicated case of neutroclusion, in which the anterior teeth are in a bad position. Everyone knows it would be desirable if a slight pressure could be placed on an erupting tooth. The slight pressure can be employed by the use of delicate finger-springs as illustrated in Fig. 10. It will be observed that the left second incisor occupies a lingual position and by gradual exertion of pressure on that tooth, it can be made to travel towards its normal position. The right first and second incisors are occupying positions of lingual version with the second incisor directly posterior to the first incisor. A finger-spring is employed which passes between these two incisors and by gradually exerting pressure, the first incisor will travel towards the position and the second incisor will have a tendency to follow it.

As the treatment of the case progresses, it will be necessary to change the appliance and add other finger-springs and probably resort to some type of appliance which will produce bodily tooth movement in some of the more greatly displaced teeth.

We have mentioned and described the use of the "T-bar" which is a special type of finger-spring. We find this T-bar can also be employed for



Fig. 11.



Fig. 12.

expansion in the premolar region as well as in the incisal region. It has the advantage of offering two separate centers of rotation, as well as the principle of wire stretching which can be employed upon the perpendicular portion of the T-bar if made from iridio-platinum.

By studying Fig. 11, it will be seen that the T-bar is soldered to the lingual base-wire and by bending the T-bar forward a rotation center is produced at the point where the T-bar is soldered to the lingual wire. The forward bending of the T-bar will carry the four incisors labially. The outward bending of the T-bar at the point of its attachment of the lingual wire in the molar region will also carry the premolars buccally. This movement of groups of teeth labially or buccally can also be accomplished by bending the perpendicular portion of the T-bar with the wire-stretching pliers. If we wish to exert pressure on the second incisors the horizontal portion of the T-bar which is made from a piece of elastic spring gold wire, can be bent so as to exert pressure on the second incisors and in that case we have a rotation center at the point where the horizontal wire is soldered to the perpendicular wire. The same manner of adjustments can be employed in

the premolar region so as to cause the first premolar to move buccally more than the second premolar and again the rotation center is at the point where the horizontal wire is soldered to the perpendicular wire.

If we wish to exert pressure upon the canine, the canine can be included in the T-bar that engages the premolar if it is desired to move it buccally. If the posterior corner of the canine is in linguo-version, it can be corrected by having the finger-spring press on it. If the anterior lingual corner of the canine requires labial movement, pressure can be exerted upon it by extending the horizontal bar which is in the incisal region. As we have said before, the canine can be included either in the incisor or premolar T-bar depending upon the type of malposition the canine possesses.

Fig. 12 shows a case of malocclusion and the appliance used in correcting the same taken from Dr. Porter's practice. It will be seen that the T-bar on the incisors has corrected the malposition that existed in that region while the finger-spring in the canine region has taken care of that malposition. The appliance, if properly constructed and manipulated, possesses a high degree of efficiency plus the fact that it is very inconspicuous and is as hygienic as any fixed regulating appliance can be.

## THE RECENT METHOD OF ORTHODONTIC TREATMENT\*

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*Translated by Margaret Gortikor, D.D.S., New York City*

I INTEND to consider the new tendencies in orthodontic treatment and their practical application to the most recent appliances. These tendencies are of two kinds. On the one hand, from a logical standpoint, we now no longer look for the displacement of the crowns of teeth, or even for the displacement of the entire tooth, neither do we look for parallel movement, but we wish to produce a bony growth, the absence of which has been the direct and immediate cause of a majority of malpositions. On the other hand, from a mechanical point of view, the actual tendencies consist of looking for simplicity, strength, and invisibility of the appliance, comfort of the patient, and regard for the laws of hygiene. My instructor, Professor E. C. Kirk, was in the habit of saying that all science was contained in these words, "le pourquoi des choses," which is a free translation of the phrase, "the reason why." I am also going to undertake to make clear the reasons which favor these actual tendencies, following the two ideas that I have mentioned before.

From a physiological standpoint, as I have already stated, we no longer look for the displacement of the crown of teeth, or of the entire tooth or for parallel movement but we wish to produce a bony growth, the absence of which has been the direct and immediate cause of many malposed teeth. It is needless for me to demonstrate that in a very great number of cases the maxillae have failed to develop normally for the very fact that the first step in all regulating cases has to be expansion, to produce a sufficient amount of space to accommodate all the teeth present in the maxilla, is practical proof and evidence in itself. Now, if to obtain the space, the operator is satisfied to act merely upon the crowns of teeth, he will not produce the profound changes in the bony skeleton, changes which are necessary to produce a result which will be perfect from all three standpoints, namely, function, permanence of results, and esthetics.

What phenomena accompany the application of force upon the tooth by means of an orthodontic appliance? Three results can be produced, and according to the point where the power acts, the tooth becomes transformed into a lever of the first, second or third class gradually as the point becomes displaced.

Example I.—If the power "P" is applied to the crown of the tooth it will become displaced in a direction induced by the power. But it does not turn about an imaginary axis situated at the apex; fixed point "F" will, on

\*Lecture delivered before the Nederlandsche Landhedkundig Genootschap in Utrecht, Holland, October 8, 1921.



the contrary, be situated toward the upper third of the root and the last part of the root will form the resistance "R" which is quite weak, moreover. This corresponds to the case in which the old type of expansion arches are used and the tooth acts like a lever of the first class. (Fig. 1.) P—Power. F—Fulcrum. R—Resistance.

Example II.—Let us change the point of application of the power "P" to the level of the necks of the tooth. At the same time we have made the fixed point "F" move to the apex while the resistance "R" will be formed by the entire length of the root and thus we have obtained a lever of the second class. (Fig. 2.) R—Resistance. F—Fixed point or fulcrum. P—Power.

Example III.—Suppose that by skill in constructing the appliance we have changed the point of application of the power "P" to a suitable part of the root, then the entire length of the tooth will form the resistance "R" and the fulcrum "F" will be located at the end of the crown. If we have accurately calculated the height of the point "P," perfect equilibrium of the tooth will be established and displacements in mass or parallel equilibrium

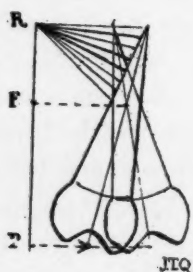


Fig. 1.

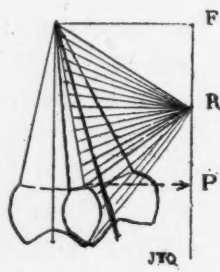


Fig. 2.

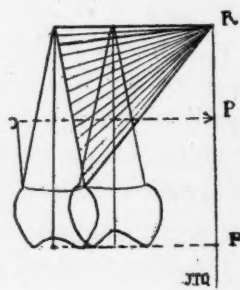


Fig. 3.

will occur, thus the tooth becomes a lever of the third class. (Fig. 3.) P—Power. R—Resistance. F—Fulcrum or fixed point.

This case is met with in practice when certain of Case's appliances are used. The same result is also produced with the use of the transpalatine arch which I will describe later.

What are the changes produced in the internal structure and what are the physiological differences occurring in bone during the process of displacing the teeth? It sounds learned to say that before the tooth is displaced a rarefying osteitis takes place but after the tooth is displaced a new formation of bone occurs due to a condensing osteitis. This is not true, however, for were it so, the entire alveolar wall would become absorbed during a somewhat lengthy process, which is not the case at all. Arthritis always accompanies rapid displacement, thus we must watch the movement and look out for any unusual sensitiveness on the part of the teeth. It is for the purpose of avoiding these irritating conditions that the Americans have for many years adopted the use of little pressure which is slow but continuous. The peculiarity of this method dwells in the fact that teeth submitted to this process are absolutely painless and also are firm in their alveoli, two points of vital importance, we must acknowledge. Now comes a point which is

no less interesting, namely, that this slow movement has stimulated the growth of bone in such a way that after the end of the treatment there is practically no tendency on the part of the teeth to return to their former position. If the active period of treatment has been reasonably long, the passive or retaining period, on the contrary, will be notably diminished.

This method offers many perceptible advantages over the old one and these can be summed up in the following way:

1. Slow, physiological action stimulating the growth of bone.
2. Absence of an inflammatory reaction (osteitis, arthritis, pain and unsteadiness of the tooth).
3. The formation of new, normal bone growth in which the teeth are firmly embedded.
4. Reduction in length of time of the retaining period.

These new facts were made applicable only after having overcome difficulties of those who first put them to use. I will not speak of the Case appliance for "contour" which is familiar to all of us, neither will I say anything about Robinson's appliance which to my mind is needlessly complicated and has never been of general use. I only use the first type. There are many forerunners who have opened this field to us and to whom we are thankful for their inventions.

In 1912 Dr. Edward H. Angle invented a new appliance which produced a radical change in orthodontic methods. It was he who was the first to attempt the use of an arch of reduced dimensions having a very slow action. But it was quickly abandoned for it was very complicated. Now, of what was it made and how did it work? Like all of Angle's appliances this one was made stationary by means of anchor bands provided with horizontal tubes of appropriate size and soldered to the buccal surface of the band, but the arch, accurately speaking, was composed of three parts, a median active part, whose square extremities slide into two other parts each of which consist of a nut and screw and which help to fasten the entire appliance into the tubes on the anchor bands. The complexity of this appliance was rendered unavoidable by the manner in which the force was transmitted to the teeth to be moved. Each malposed tooth was fitted with a band, soldered on its lingual surface. This band supports on its labial (or buccal) surface, a small vertical tube into which fits a pin soldered to the middle portion of the arch. Thus, the ends of the appliance fit into the horizontal tubes on the anchor bands while the pins on the middle portion slide into the vertical tubes which, theoretically, ought to be parallel to each other. This is frightfully complicated and so it is understood that despite the advantage derived from being able to produce parallel movement of any tooth, the disadvantages, such as loss of strength to the joints and enormous difficulties involved in constructing it, have made this appliance fall into disuse very quickly.

Angle's most recent appliance was invented in 1917. He claims that as far as simplicity is concerned, it marks a very distinct step forward. This arch itself is no longer made in three parts, but consists of one part which is an invaluable improvement. Then again, its side view is changed, for

instead of being round, on cross-section it presents a flattened, almost oval, appearance and it is known as a "ribbon arch." Now, as to its means of attachment to the teeth, he still uses the anchor band but instead of the vertical tubes, he used vertical brackets very simple in structure and into which it is easy to place the arch and lock it by means of small pins. However, this appliance is also very complicated and requires great skill to construct and use it satisfactorily.

It is several years now since Lourie first used the lingual wire, not merely as a passive appliance to act as a retainer after the results have been obtained, for that was the purpose of its use for many years, but he makes it the active agent in the treatment. He also uses it in combination with a labial arch which passes quite high up on the gums and has vertical projections which pass downward and rest upon the crowns of the teeth. Then again at other times, he uses the lingual wire alone. This process is excellent in all points but one and that is the arch is soldered to the anchor bands. Thus, the appliance is absolutely stationary and all the adjusting has to be made in the mouth. Consequently the operator works blindly without knowing whether the way in which he used the pliers will produce the desired effect. But, as regards simplicity, upon comparing it with Angle's appliances, it shows so many advantages over them that it seems the operator ought not to hesitate a moment about using it and seeing that in this appliance, the very "ne plus ultra" of simplicity has been attained. Indeed, what can be simpler than having the anchor bands and the arch forming one piece which is strong and cannot be easily bent out of shape?

This arch could be improved upon still more and this was accomplished by Dr. John V. Mershon who made the lingual arch removable by adopting a system of "locking devices" such as Angle and Young have used for other purposes. At the price of a slight complication, he, at the same time, has made allowance for the judicious and variable distribution of available force by means of springs supported by the arch. Here is a detailed description of the structure of the appliance. Firstly, the anchorage which like all the other appliances I have described, is produced by banding the molars, the bands being soldered instead of clamped so as to be of less annoyance to the patient. Then, the anchor tube, instead of being on the buccal surface, is located on the lingual surface (Fig. 4).

The tubes are not horizontal but vertical (Fig. 5 and Fig. 6), and instead of being round they are half round; then again instead of measuring 15 to 20 millimeters in length they only measure 2 to 3 millimeters. It is very apparent that in this way it has been rendered much less cumbersome. The removable lingual arch is made of one piece and at its extremities there are locks, while the portion of the appliance located between the locks is contoured to follow the irregularities of the teeth. The locks are formed by soldering a half-round wire near the end of the arch, which wire will fit exactly into the vertical tube of the band (Fig. 7). The part of the arch directly back of the vertical wire follows the contour of the tube and grasps it in a manner similar to holding an object between the thumb and forefinger. The



free end of the arch, which terminates in a ball, properly speaking, constitutes the lock, and when placed gingival to the tube all vertical motion is prevented on the part of the half-round wire which thus becomes immovable. In front of the lock (Fig. 8) the arch makes a double curve which carries it from the occlusal plane to the gingival border which it follows from one lock to the other. In order to transmit the force to a decided point, you can add one or more auxiliary springs to the lingual arch. These are made of wire, of a smaller gauge than that of the lingual arch, and are soldered to it by one of their ends, the free extremity being applied to the tooth to be moved. The lingual arch, thus constructed, forms one of the most adjustable of all the appliances and can easily be made into other combinations.

In certain cases, however, Mershon's removable lingual arch cannot be

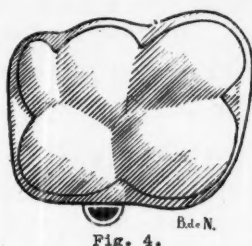


Fig. 4.



Fig. 5.

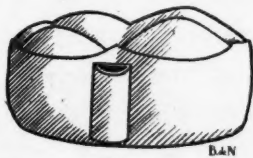


Fig. 6.



Fig. 7.

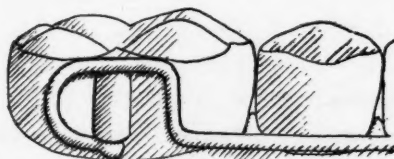


Fig. 8.

used; this occurs in cases where the bite is very close, where the mandibular incisors meet their opposing teeth very near the gums or where the mandibular teeth almost reach or do reach the palate. In these conditions, the lingual arch or the auxiliary spring interferes with complete occlusion and so ought to be rejected. Again we must look for a new type of arch for these conditions. After much looking and desiring to at least preserve the inherent advantages of the lingual arch, I have agreed upon a form of appliance that I call the "transpalatine arch." The construction of the transpalatine arch requires very little material, namely, a strip of 22 K. gold, gauge .25 mm. and 5 mm. in width for making the anchorage bands, .15 mm. is the gauge of gold used for the other bands; some half-round platinized gold wire and half-round tubes of the appropriate size so that the wire can slide into it with little friction, then some round wire of platinized gold about .9 mm. in

diameter for making the main arch. For the auxiliary springs, the wire can be slightly thinner measuring about .75 mm. in diameter. I use the wire called "Gold-Platinum retaining wire" which is manufactured by the S. S. White Company of Philadelphia.

Now for the characteristics of the appliance. Firstly, anchorage is obtained by placing bands without screws on the molars as in the preceding cases. In certain cases where the occlusion is particularly defective, it is impossible to make the vertical tube of proper height; thus we use two vertical tubes instead, one placed next to the other (Fig. 9, occlusal surface of anchorage band; Fig. 10, proximal surface of anchorage band; Fig. 11, lingual surface of anchorage band).

In all cases, at each end of the half-round tube, you hollow out a small part which will form a bed for the arch and give it a firmer seat while strengthening the lock at the same time. In front of the vertical tubes, the arch turns toward the palate at the mesial surface of the molar, for example,

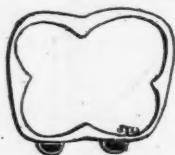


Fig. 9.



Fig. 10.



Fig. 11.

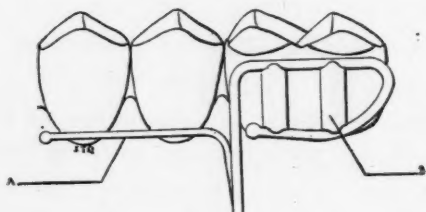


Fig. 12.

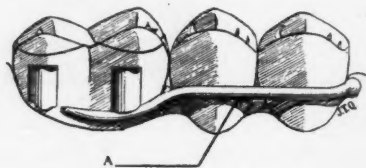


Fig. 13.

and then passing in a vertical plane, it exactly follows the irregularities of the palate as close to the mucous membrane as is possible. Thus, in proportion as the palate will change its form, the arch will follow the same changes. In order to act upon the teeth which do not serve as anchor teeth, we will use auxiliary springs which are strongly soldered to the arch. (Fig. 12, A—Auxiliary Spring; B—Lock of high type.)

In other cases it may be of greater advantage to use the arch without the auxiliary spring, then you can solder a "resting bar" to the anchor band, and this bar transmits the force to the teeth with which it comes into contact. (Fig. 13—A "resting bar" soldered to the anchor band. Due to an error in drawing, this bar does not rest at the necks of the teeth which is the correct position for it.)

I have not found another appliance which has given me so much satisfaction as this one has for the expansion of arches preparatory to all treatment. I lay stress on the fact that, originally I had not intended this appliance to completely treat orthodontic cases. Nevertheless, it is easy to modify it in the course of its use so that it can serve throughout the process and

this can be done by hooking the free ends of the auxiliary springs across the palate after all the desired expansion has been obtained.

I have described the most recent appliances in the realm of orthodontia. In what way are the principles of levers applied to each of these appliances? As to Angle's appliance with its numerous bands you can admit the application of the power to be at a point outside the root. As a matter of fact Angle claims to obtain parallel movement of the teeth through their medium. Now coming to lingual arches, fixed as well as removable, the pressure upon the teeth is very slight, and if sometimes there is a slight tendency on the part of the tooth toward rotation about the apex, this tendency is corrected by the forces of occlusion which, acting continuously, correct and compensate it. Now, as to the transpalatine arch, it is obviously a lever of the third class since the appliance reaches to the very apex of the anchorage tooth.

Now, it remains for us to investigate how these appliances meet with the modern demand for invisibility, hygiene, and for the comfort of the patient. As far as invisibility is concerned perhaps it is best to quietly overlook the Angle appliances with their numerous bands. It is evident that an appliance of this sort will attract the eye very readily. On the contrary, the lingual arches, whether fixed or removable, and for a still greater reason, the transpalatine arches, are invisible to all, and very often my young patients have to submit to an examination by their little friends in order to convince them of the presence of the appliance.

Coming to hygiene, it stands to reason that an accumulation of appliances which interferes with the contact between lips, cheeks and the teeth, and which prevents proper use of the brush, must predispose to caries. Such is no longer the case when the entire appliance is hidden on the lingual surface, and the entire length of the gingival border is easily cleaned by the bristles of the brush. A still better condition is brought about when the appliance crosses the vault of the palate and so does not come in contact with the teeth at all.

Finally, considering the comfort of the patient, none of these appliances are annoying after the patient becomes accustomed to their presence for none of them should cause any pain; it is claimed, however, at all times, that the labial appliances are more annoying than the others because they are not so close to the teeth and therefore cause continual stretchings of the lips and cheeks. Now, for the action on soft parts, it is very important that you be able to do away with any injurious consequences to them.

I do not want to abuse your patience any longer so I will end my lecture with a summary. The appliances of actual repute for orthodontic treatments are based on the following facts: The majority of malpositions are due to a lack of development in the bony skeleton. Before all other things we must, thus, stimulate the bony growth by the continual application of a slight amount of force acting without interruption. To accomplish this, we must use appliances of small size and incapable of developing too much power. This force should be applied as near the apex of the tooth as possible. But although it be of small dimension, the appliance should still be strong and



it must be simple without any complex construction; this condition is essential so that it may meet the requirements of hygiene and be comfortable to the patient at the same time. The appliances, furthermore, should be able to serve as a retainer without any need of adjustment which case is necessary when a patient becomes ill, leaves on a long journey or goes for a vacation.

All these considerations and even many more are found combined in the removable lingual arch such as Mershon describes and also in the transpalatine arch, a derivation of Mershon's arch, which I have described here.

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## THE WORK OF RETZIUS' CONSIDERED FROM OUR PRESENT KNOWLEDGE IN RESPECT TO MALRELATION OF THE DENTAL ARCHES

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BY B. W. WEINBERGER, D.D.S., NEW YORK CITY

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IF, AS in a recent number of this Journal a contributor expressed, the basic knowledge of dentistry, and this includes orthodontia, is acquiring an understanding of the biologic principles which concern growth, development, etc., and the application of these principles to dental problems, then it is unfortunate that more do not try to determine the relative value of the evidence as presented in medical literature with an interpretation of same. Hasty conclusions should not be jumped at from isolated cases presented without first considering the average for a whole group of the evidence presented. At the same time it is unfortunate that there are some who do not go beyond the material mentioned by others without referring to the original source of information, thus thereby acquire first hand information. Were this rule to be followed, some surprising facts would be brought to our attention and our views thus modified.

It is necessary and essential for us to review the material placed at our disposal, from our position and place our own interpretation on same, endeavoring at the same time to clear up a lot of false statements that are thus misleading not only to ourselves but to the whole profession. On the other hand it might be "folly to be wise where ignorance is bliss." These same articles agree that the form of a structure can be so modified through inhibition of natural processes of growth and development during the embryonic and fetal period, as to cause abnormalities, and that these conditions are then retained through later life. If such is a fact, it is therefore advisable to study this stage more carefully.

As a few illustrations used in my previous articles have been criticized, unfortunately through an error found in "Keibel and Mall," I intend to review the whole of Retzius' work from the original, and endeavor to correct these facts which are misleading and thus hindering our working knowledge of one of the etiological factors in orthodontia.

In my first article,<sup>2</sup> I presented a "series showing a marked retrusion

and protrusion of the mandible," Fig. 19, (Retzius). In the second<sup>3</sup> article, page 10, these same illustrations were repeated "showing a few of the variations found."

Johnson<sup>4</sup> and Hatfield<sup>5</sup> in using same illustrations states: "That the forward growth of the mandible is a natural process is evident in a study of the embryology of parts."

Keibel and Mall: "Fetus 42.5 mm. in length, and estimated at nine weeks old. In profile view the great development of the forehead region is striking, and below this the root of the nose is deeply depressed. The nose is still low, but the jaws and chin are well marked, the nose is very broad in proportion to its height, and the external nares are closed by the epidermal plugs which are continuous with an epidermal thickening of the upper lip."

Keibel and Mall: "Note especially the projecting upper lip and the receding chin, the double lip and the shape of the nose. The prima has almost a position it holds in the adult. In the first half of the third month the two lips project equally, but later the border of the upper lip and the



Fig. 1.

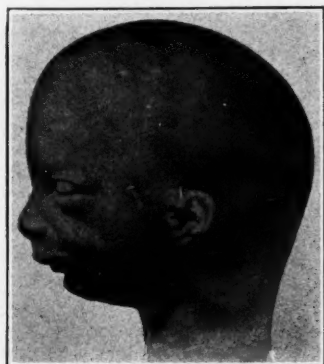


Fig. 2.

Fig. 1.—Enlarged drawing of Figs. 3 and 4 showing the results produced by pressure of the hands against the maxilla thereby causing an arrested growth of the same, while the mandible has continued to grow through lack of interference.

Fig. 2.—Enlarged drawing of a 117 mm. embryo, described in Fig. 10.

lip itself grow more rapidly, so that in the fourth and fifth months it projects markedly beyond the lower lip; by a stronger growth of the lower jaw and lip this difference is gradually overcome in the sixth to the ninth months, but by a kind of inhibition process the early fetal arrangement may be retained in the adult to a marked degree."

Hatfield<sup>5</sup> on the other hand has gone a step further and quotes as follows: "The accompanying illustrations from Keibel and Mall's *Human Embryology*, will show how a normal stage of growth may present an apparent malrelation of parts, whereas only when it persists or occurs at another period is it abnormal.

"Fig. 1, head of a fetus 42.5 mm. seen in profile Chapter VI. Development of Human Embryo, Fig. 71. "In the profile view the great development of the forehead region is striking and below this the root of the nose is deeply depressed.

"Finally the profile view of the head of a fetus 117 mm. in length may be shown (Fig. 2) and in it I would draw especial attention to the projecting upper lip and the receding chin, to the double lip and to the shape of the nose.

"In the first half of the third month the two lips project about equally (as seen in Fig. 1) but later the border of the upper lip, and the lip itself grow more rapidly so that in the fourth and fifth months it projects markedly beyond the lower lip (Fig. 2); by a stronger growth of the lower jaw and lip this difference is gradually overcome in the sixth to the ninth months but by a kind of inhibition process the early fetal arrangement may be retained in the adult to a marked degree.

"Only ignorance of the developmental conditions normal for this period could mislead one to believe this to be an early stage of malocclusion. Later stages of growth in children between the ages of four and six or eight may show certain positions of the teeth, and width of the jaw, or structural rela-



Fig. 3.

Fig. 4.



Fig. 5.

Figs. 3 and 4.—Front and side view of an embryo 42.5 mm. Reduced one-half. Unfortunately these reductions in size have caused a loss of detail and a true conception of these deformities.

Fig. 5.—Embryo 54 mm. long. This specimen clearly shows the normal relationship of the two dental processes, with the lips directly over each other. This condition is found at various ages and is taken as a "normal".

tions disturbing when measured by a preconceived notion of the normal and regarded by some men with unwarranted apprehension."

Unfortunately Hatfield has seen fit to criticize my previous statements and claims that only ignorance of the developmental conditions normal for this period could mislead one to believe this to be an early stage of malocclusion. Malocclusion in the first place, I understand, can only be associated with the two dental arches when the teeth have erupted and are present, but this I have carefully avoided stating at all times, that there is a malrelation of the dental arches and not malocclusion, due to various conditions found and already recorded. To arrive at some satisfactory conclusion, we certainly must determine then just what is normal. It is for that reason I desire to review the specimens as found in Retzius' work, for it was this treatise that was used originally in my first article in 1916.



Figs. 1 and 2 are not photographs from the original specimens, but drawings enlarged to bring out more clearly the facial outlines. Fig. 1 is to be found in Table XVI, Figs. 8 and 9 (original Figs. 1-3, Table XV), while Fig. 2 is Fig. 10 of Table XVII, (original is Fig. 10 and 11, Table XV).

Figs. 1 and 2 are, however, those I used in my previous articles.

Figs. 3 and 4 are the original of Fig. 1 slightly enlarged, but the same size as shown in Retzius of a 42.5 mm. embryo, ten weeks old, and is the only



Fig. 6.



Fig. 7.

Fig. 8.

Fig. 6.—Show embryos of 68 and 77 mm, about three months old. Reduced one-half. The lips and dental arches as in Fig. 5.

Figs. 7 and 8.—Embryos of 93 mm. Reduced one-half. Although of same age and length they show a marked difference in position and development of mandible.



Fig. 9.



Fig. 10.

Fig. 9.—Twins of 115 mm. Reduced one-half. These show clearly a difference might be found even in twins. See also Figs. 18 and 20.

Fig. 10.—Embryo of 117 mm. Enlarged drawing is shown in Fig. 11. Reduced three-fourths. Retzius calls attention to "the lower lip and chin having markedly retracted."

one to be found showing the result of the inhibition of growth in the superior maxillary regions with the mandible either slightly protruded or the result of interference in growth of the maxilla. Why this has probably occurred, can be readily seen by the position of the hands, as Retzius states these to be in the natural position. That the position of the hands has an important

bearing upon resulting conditions I have endeavored to show in my previous papers.

That there is a marked variation in facial development of the same corresponding age of development can be seen in the following illustrations and evidence cannot and should not be based upon isolated cases, but must be considered from the *average of cases* and *correlated with other findings*.



Fig. 11.—Embryo of 117 mm. presenting a similar condition to that shown in Fig. 10.

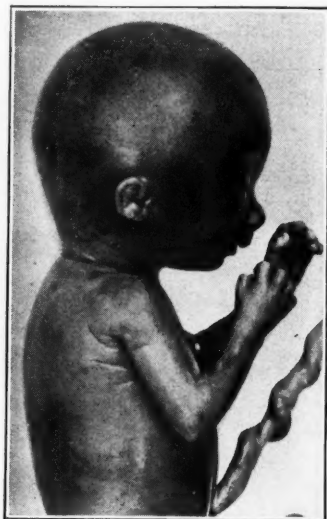


Fig. 12.—Another example of 117 mm. embryo.



Fig. 13.—Embryo 130 mm. Reduced one-half. In this case it is even more pronounced.



Fig. 14.—Embryo 131 mm. Reduced one-half. Compare the "normal" relationship of the dental arches with previous figure.

Fig. 5 is an embryo 54 mm. long, natural size, also an embryo of ten weeks.

This specimen shows the mandible, from my studies of hundred of embryos, to be in normal relationship to the maxilla, with the upper lip directly over the lower, quite a difference from the one shown in Figs. 3

and 4. "The hands and feet are placed higher, fingers and toes are not spread so far apart as in the previous embryos."

Fig. 6 shows embryo of 68 and 77 mm. about three months old. Reduced one-half in size.

The lips and relationship of the jaws are the same as in Fig. 5.

Figs. 7 and 8, embryos of 93 mm. although of the same age, a difference in the position of the mandible is noticed.



Fig. 15.—Embryo of 152 mm. Reduced one-half.



Fig. 16.—Embryo of 155 mm. Reduced one-half.



Fig. 17.—Embryo 151 mm., "normal". Reduced one-half.



Fig. 18.—Twins 163 and 169 mm. showing another decided variation. Reduced one-half.

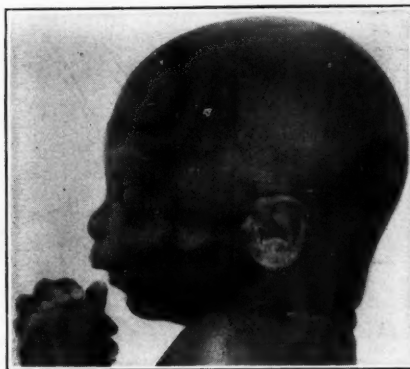


Fig. 19.—Embryo of 166 mm.

Fig. 9 shows twins of 115 mm. That there is a difference in developmental conditions normal for the same age, contrary to what others have supposed, is readily seen in this set of twins. The embryo in the left "has a larger, longer head and face, the nose and upper lip are larger and more prominent, the distance between the ear and the upper lip is, in the one on the left, strikingly greater." The mandible is also further posterior.

As both Johnson and Hatfield have utilized embryos of 117 mm. it will be advisable to dwell upon a number of specimens found in Retzius.



Fig. 10 is the same as Fig. 2, reduced one-half natural size. The facial outline is markedly different and more extreme than that shown in either of the previous Fig. 9, although of the same relative age. Retzius states that in this specimen "the upper lip appears swollen, because the upper alveolar process towers above the lower; for the lower lip and chin have markedly receded."

Figs. 11 and 12 are two more examples of 117 mm. embryos, certainly there must be a "normal."

Fig. 13 is 130 mm. and is even more pronounced.

Fig. 14 is 131 mm. Here again is shown an entirely different profile although relatively the same age embryos as the previous illustration.

Again the difference appears in Figs. 15 and 16, 152 and 155 mm. respectively but less pronounced than in Fig. 14.



Fig. 20.—Twins 162 and 174 mm. Contrast with Figs. 17 and 18. Reduced one-half.



Fig. 21.

Fig. 21.—Embryo, 175 mm., "normal". Reduced one-half.



Fig. 22.

Fig. 22.—Embryo, 177 mm. This certainly does not show that there is a stronger growth of the lower jaw and lip and that this difference is gradually overcome later in embryonic development. Reduced one-half.

Fig. 17 is one of 151 mm. and we here find again what is undoubtedly the normal relationship of the two alveolar processes.

Fig. 18 represents another pair of twins 163 and 169 mm. "Both of these faces are distinctly different and it is hardly believable that they are sister and brother, much less twins."

When viewing these marked variations at any age I fully agree that only ignorance could mislead one to believe that there was no variation in developmental conditions at an early stage of development, but we must have a normal and which of the two represents the normal?

Fig. 19 is an embryo of 166 mm. There is no question of the marked malrelation of the two jaws. Note again the position of the hand.

Fig. 20 is another set of twins 162 and 174 mm. Here again we find a slight variation in facial contour, but not as great as in the previous sets of twins.

Fig. 21 represents an embryo of 175 mm.; contrast this with Fig. 22 of 177 mm. Here again we must determine between the normal and abnormal.



Fig. 23.—Embryo, 204 mm. At this age we still must contend with abnormalities. Reduced one-half.



A.



B.

Fig. 24.—Embryo, 206 mm. Contrast with the previous illustrations.

Figs. 23 and 24 are the oldest embryos shown by Retzius, 204 and 206 mm. and we still must contend with variations.

These are but a few of the examples to be found in the biologic studies of Retzius, but I am convinced will show that we do find variations at all ages in the embryo and that the facial region is subject to the same mal-developments, as have been found in other parts of the anatomy.

I cannot agree with either Johnson or Hatfield "that the forward growth of the mandible is a natural process as evident in a study of the

embryology of parts," for if the mandible is retarded in its normal development during embryonic growth, it seldom will regain the amount of this maldevelopment, nor will this difference be gradually overcome in the sixth to the ninth month, through a stronger growth of the lower jaw.

A close study does not bear out Keibel or Mall's assertion of isolated cases that "in the first half of the third month the two lips project about equally, but later the border of the upper lip, and the lip itself, grows more rapidly so that in the fourth and fifth months it projects markedly beyond the lower lip, by a stronger growth of the lower jaw and lip this difference is gradually overcome in the sixth to the ninth months," for we find variations between the normal and abnormal at all stages of development. I do believe, however, with them, that by a kind of inhibition process the early malarrangement may be and is retained in the adult to a marked degree. The above study convinces me that my previous correlations with dried skulls were correct and that we do have a normal for all stages of development and that this normal is the same as in adult life. We must not permit ourselves to be misled by isolated cases and I trust this will also show we must investigate these studies more carefully ourselves and not rely upon others to do so for us. Their interests are not the same as ours, and unless we call their attention to what we are interested in, we cannot blame them for misleading us.

Further proof that the facial as well as other parts of the anatomy is liable to abnormalities prior to birth is shown in the two articles previously referred to, as well as in a more recent article,<sup>6</sup> and that the relationship of the jaws in a normal skull at birth and at all stages of embryonic development is I am sure the same as in adult life.

#### BIBLIOGRAPHY

- <sup>1</sup>Retzius, Gustaf: *Biologische Untersuchungen*, Neue Folge, xi, 1904.
- <sup>2</sup>Weinberger, Bernhard W.: Important Prenatal Factors that Influence the Development of the Facial Area, and Cause Malrelation of Dental Arches at Birth. *Items of Interest*, November, 1916, p. 813.
- <sup>3</sup>Weinberger, Bernhard W.: The Results Observed in a Further Study of Prenatal Causes of Dentofacial Deformities. *Internat. Jour. Orthodontia*, January, 1918, pp. 1-23. *Items of Interest*, pp. 6-30.
- <sup>4</sup>Johnson, LeRoy: The Temporomandibular Articulation in the Distocclusion Case. *Internat. Jour. Orthodontia*, November, 1921, pp. 581 and 585.
- <sup>5</sup>Hatfield, Hugh K.: Prognosis—Distocclusion Cases. *Internat. Jour. Orthodontia*, January, 1922, pp. 22 and 23.
- <sup>6</sup>Weinberger, Bernhard W.: Studies of the Position in Utero, and Mechanical Disturbances, as Revealed by the Roentgenogram and the Probable Etiological Bearing on Dentofacial Deformities, *Dental Cosmos*, June, 1922, pp. 643-60.



## DEPARTMENT OF ORAL SURGERY AND SURGICAL ORTHODONTIA

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### THE PRACTICAL APPLICATION OF OUR THEORIES IN SURGICAL EXODONTIA

BY JAMES F. HASBROUCK, D.D.S., M.D., NEW YORK, N. Y.

THE *Journal of the National Dental Association* published an editorial in November, 1920, from which the following paragraphs are selected. "Enthusiasm for the new, the impressively scientific, and the elation in the consciousness of being up to the minute, explain in a large measure the prevailing frame of mind."

"We have seen successive waves of scientific procedure and enthusiasm die upon the shore of practical experience."

"Another fact obtrudes—we listen patiently to many papers and more discussions on multitudinous subjects over and over again. Chemistry, organic and physiological, is presented and a listening chemist distressed, leaves. Then it is bacteriology, or histology, or mayhap surgery and an attentive specialist in one of these becoming restive, departs. A question at a later time brings the illuminating reply that the essayist was overstating or misstating, or impossibly concluding in many of his assertions."

"Confidence then in definitions, diagnosis, formulae, procedures, weakens."

For a time previous to the great war, in fact ever since the theories of focal infection have been advanced, much attention has been centered upon the oral cavity. Both the medical and dental professions agree that the mouth and teeth and particularly the granulomata or radicular abscesses which develop about the apices of the roots of dead teeth, are a very probable breeding place for many of the bacilli which are responsible for general or organic disturbances, and which are carried by the blood stream from these sources to various points throughout the system. Many methods for

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the treatment of these conditions have been suggested—and in most cases, or perhaps I should say in the worst cases, surgical treatment seemed to produce the best results. At this time the specialty of exodontia and oral surgery received a distinct impetus—more specialists entered the field. Since the perfection of our technic in local anesthesia and especially since the war the crop of oral surgeons and exodontists has increased a hundred fold. This is as it should be. No branch of science may advance without active competition with its necessary investigations and experiments. And our branch at the present time is advancing rapidly.

I come before you this evening to say a word of caution, to sound a note of warning anent the radicalism in operative procedure which has been and still is advanced by some of our most able oralists.

Because a man happens to be an enthusiast and because the doctrine that the dental structures are the foci for the localization and dissemination of the agents of systemic infection is accepted; are we therefore to be expected to accept their advocacy of radical procedures in toto? As a matter of fact in studying the writings of these enthusiasts, they appear to be mostly on the defensive and they are busy answering various theoretical objections to their technic.

Our every day technic is I believe fairly well standardized if we omit the arguments of the enthusiastic few. The most important factor is that of diagnosis, which should be arrived at with painstaking care. There should be as accurate a history of the case as possible, which can be done through the cooperation of the physician in charge if necessary. Then the clinical examination should be made in the course of which not only the dental structures, but the tonsils, throat and nasal passages should be examined very closely. Then the radiographic examination should be made and comparison made with the clinical picture. The making of a judicial dental diagnosis is not always a simple procedure, and very often the skill and ingenuity of the consultant is taxed to the utmost in working out the chain of evidence upon which he must base his opinion.

The typical case of course is the usual history of the result of a general toxemia from some unknown foci. Everything excepting the contents of the oral cavity presumably having been eliminated. The patient comes to one of us for consultation and possible treatment. The mouth may be in a sanitary condition, or not and if not, it must be made so. Ill fitting crowns and bridges should be removed. The teeth should be cleaned and the gingival margins made healthy. After this is done we are ready to consider the amount of surgical interference which may be necessary. The teeth which should be removed are first all those which will not yield to reasonable treatment. Those which in spite of our most painstaking efforts still show a discharge of pus at the gingival margin, or any other symptoms of an inflammatory process going on, either acute or chronic. Secondly, the dead or devitalized teeth should be considered. Those which show areas of rarefaction about the apices of the roots should be studied most carefully. I know that our extremists say that all dead or devitalized teeth should be

removed. I cannot accept this theory as yet. Our percentage of proved cures is still too small to make such a sweeping statement.

Don M. Graham says:

"There is the greatest confusion and disagreement regarding the status of the devitalized tooth. It is pretty generally conceded that teeth should never be designedly and purposely devitalized as a mere matter of convenience and mechanics for dental restorations. One class of physicians and dentists claim that no devitalized teeth should ever be harbored in the mouth. Still another class maintains that with careful sterilization and obturation of the canal, little, if any systemic trouble can possibly arise, since the focus, if there be one, is securely walled off by nature. Yet another body of serious and conscientious practitioners takes a middle course and maintains that with the healthy individual it is permissible and highly advisable to undertake aseptic and careful root canal filling without any fear of serious consequences. With another class of patients who are below par and show physical deterioration, they as strongly contend that no compromise should be made with the devitalized tooth.

"If a patient shows a tendency to rheumatism, or a tendency to easily catching 'cold' under no circumstances should such a person be compelled to carry the additional load of a possible dental infection. No patient belonging to the 'rheumatic group' can successfully harbor a devitalized tooth for at some inopportune time this damaged apical area is very liable to become hematogenically infected and a crippled condition is not infrequently the result."

The general conclusion seems to be that all other foci having been located or eliminated, the removal of the infected teeth should be undertaken.

The question is which and how? It is my opinion that in many cases, unfortunately it may become necessary to remove all. Let me remind you that I am now discussing cases which have come for treatment because they are sick—we know there is something wrong. Beginning with the removal of those teeth which on radiographic examination show definite areas of radiolucency about the apices of the roots. I am not wedded to any particular or spectacular technic for the removal of these teeth, excepting that I believe the simplest way to be the best. Every one must concede that the best instrument for extracting teeth is the forceps. An exodontist should be perfect in his knowledge of the manipulation of the various forceps. Other instruments may be an aid, certain operators have their pet methods, but for surgical exodontia the forceps is my instrument of choice whenever it can be used. When currettement is necessary, and it is not necessary in every case by any means, it can be done following the extraction with the greatest ease. The soft tissue can be dissected free and as much of the outer wall of the tooth socket removed as the most ardent enthusiast could desire. From a mechanical standpoint the cutting away of the alveolar wall should logically follow rather than precede the removal of the tooth. For the cutting away of the outer plate of bone we may use a bone burr, chisel or rongeur forceps.



I cannot agree as yet with those who advocate the chopping out of each and every tooth to be removed together with a considerable amount of presumably infected bone adjacent thereto. How does the radical operator know where to stop? I would not. I will venture to say that in 50 per cent of these radical operations, if the field of operation were cut into, say in from six months to a year following, a smear taken and a culture made, we would be able to isolate a moderate number of the same bacteria that were present at the time of the first operation. You may ask, How do I know this? I am unable to prove it yet, but that is my theory and I believe in time I shall be able to demonstrate it quite to your satisfaction. I do not make any protest against this technic on this account—excepting to point out that the most radical operation in my opinion is not perfect and that we can achieve the same result by using gentler methods. After the surgical work is completed a plan for restoration should be worked out giving to the patient as nearly as possible a normal occlusion and good masticating surface. These restorations should be of a sanitary and removable type.

There is nothing particularly new about this method of using the chisel on the outer plate of the process for the removal of teeth. It was described and illustrated by Prof. Williger of Berlin in 1911 in his work, "Oral Surgery," as a means of removing difficult teeth and roots and as such should be highly commended in many cases.

In very many cases the abscess sac or granuloma, or whatever you may choose to call it, comes out intact attached to the root. You will grant, I am sure, that in these cases no curettement is necessary. Curettements are necessary whenever there is any visible area of infection and not only should this be done, but it should be followed up by a thorough swabbing out with an antiseptic, such as tincture of iodine whenever the outer plate or any definite area of bone has been removed.

The extent to which the bone cutting should be carried is a question of judgment which rests entirely with the operator as applied to each particular case.

Many successful cases where palliative or reconstructive treatment has been attempted have been reported and in this connection, the operation of apicoectomy, the amputation of the diseased root end with the curettement of the adjacent area, is mentioned.

In my own experience I have found the prognosis so uncertain, the results so unsatisfactory, that I have concluded that it is much better practice to remove the tooth. The operation itself is very easily performed. A semilunar incision is made in the gum opposite the end of the root, the flap is dissected up, the end of the root is exposed, the area about the root end is cleaned out with burr, curet or chisel, as the case may be. The apex being exposed, it is cut off well below the diseased area—the root canal of course having been previously filled if possible to the apex. In a case of this sort no harm is done should the filling material be pushed through the apex. The pocket formed as a result of the operation having been well swabbed with an iodine solution, may be sutured, or may be packed and heal by granulation.

After having performed a great many of these operations with more or less negative results, I have come to the conclusion that as a means of removing a source of infection it is not a success. I believe Novitsky is right when he says that we are not arriving anywhere when we cut off a portion of a dead, septic root and allow the rest of it to remain in the jaw to continue its insidious work. But on the other hand, where we see patients with normal resistive power, apparently in perfect health, should not this method be advised as a prophylactic measure in our consideration of dead teeth, rather than advise a complete removal? I can recommend for your consideration on this point reports by Rhein, Merritt and others.

We are all studying the problem of impacted teeth. Regarding their etiology, I think very little is known—at any rate we have arrived at no very definite conclusion. Sometimes the impacted teeth are visible in the mouth—at others the information is imparted by the radiogram. These cases present for several reasons, perhaps the most common is that for sanitary reasons or prophylaxis it is deemed wise to remove the teeth. Then again there may be definite symptoms of various kinds—headaches—pain referred to the eye or ear—in many cases quite severe and of a neuralgic character.

We are all familiar with the picture as presented by the history, radiographic examination and clinical examination.

I am gratified that I am able to say that in these cases I believe our operative technic is fairly standardized. The operation should be carefully planned and performed as expeditiously as possible—by this I do not mean hurry. The perfection of local anesthesia has been a boon to humanity, but in one sense it has been a curse in that almost any one, no matter how unskilled or inexperienced, may by this means attempt many operations for the performance of which he may be quite unfitted, and because it does not hurt the patient and there is an hour or so in which to work, may get away with it somehow. This is neither exodontia nor oral surgery. What we desire is a group of men who are able to accurately diagnose these cases, have a well defined idea as to the method to be followed, and then perform the operation in a clean cut and expeditious manner.

An outline of the technic as usually followed: After having made the diagnosis and settled upon the anesthetic, the field of operation is cleaned and swabbed with tincture of iodine. An incision is then made in the soft tissues, just over the impacted tooth; they are then stripped back with a periosteal elevator so that all of the overlying bone around the impacted tooth is exposed. Then with a suitable bone cutting instrument, either a chisel, a burr, a rongeur forceps (why specify the instrument, some do well with one, some with another, this is a matter of judgment entirely, and we have no right to make rules to which exceptions must be taken in each individual case), the impacted tooth having been well exposed, it can be picked out with the forceps or pushed out with an elevator or exolever.

Just a word here regarding our anesthetic for these operations. We seem to have developed two kinds or schools of exodontists and oral surgeons—those who use local anesthesia and those who operate under general anes-

thetia. This in my opinion is wrong—it is creating a split in our ranks where no split should exist. A good operator can operate using any kind of anesthesia, or if the occasion should demand, without any at all. The question of anesthetic also is entirely one of judgment in every case. Perhaps the patient may have a preference and whenever this is the case I always humor my patient when it can properly be done. All of this talk about so and so being a conductive man, or an N<sub>2</sub>O man, or an infiltration man, should be “scrapped” and never referred to again. We are all exodontists and oral surgeons, and good operators I trust—and I think that the choice of anesthetic to be used in each case can be safely left to our judgment, along with other details of the technic.

In closing I should like to say a word of protest regarding some of our professional brethren who are shouting from the housetops their advocacy of this or that technic in such a way that one might infer that everything else is wrong. Is it not true that two men of equal mental poise may have the same education, pass the same number of years in a profession and ultimately arrive at different opinions on some leading questions?

Let me quote a paragraph from the writing of one whose voice we have frequently heard—“Dead septic teeth should not be pulled. They should be dissected out according to the technic I have described. The dissection should be done under novocaine anesthesia.” Another illustration from a medico-legal authority—“After extensive observations I do not hesitate to maintain that general anesthesia, with the few exceptions enumerated, is unnecessary in operations in the oral cavity, and that, as a medico-legal expert, I should be unable to protect an operator from indictment in case of fatal accident from general anesthesia.” In this instance the “exceptions” enumerated nullify the entire paragraph; nevertheless, in my opinion, it is an unwise statement. Many other quotations might be given. From what source do these writers derive their omniscience?

Let us say what we think by all means; if we have anything novel to propose let us do so. But at least let us give the other fellows credit for doing a little thinking of their own. Probably in time other and better methods may yet be suggested and I am sure I shall try everything which appears at least once. But we should be more conservative in our statements. It is this habit of loose talking which makes so many serious misunderstandings. Let us preach what we practice by all means, but only what we practice—not a lot of theoretical bunk. Let us be honest with ourselves, our patients and with each other.



# DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

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## DENTISTRY AS A BRANCH OF MEDICINE\*

BY R. WALTER MILLS, M.D., ST. LOUIS, MO.

IT IS my desire to discuss with you informally certain matters concerning the relation of medicine to dentistry under present conditions. The opportunity to do so comes through your kindness and is very much appreciated.

You know, of course, that dentistry evolved with medicine about a century ago as an art of humble origin, originating through the activities of the barber surgeons and medical men of the time. Modern dentistry, a later product, evolved largely through the work of Pierre Fouchard, a Frenchman. Like many subjects that developed with, and were at first largely founded through, the acquiring of mechanical skill, it rapidly tended to divorce itself from its source of origin. But in reality dentistry originated as and has always been a branch of medicine. Its present and future tendency, judging by the analogy of various other branches of surgery and medicine, will be to develop broader outlets, to become again and more intimately a part of medicine. Examples are numerous of similar evolutions and adjustments in medicine. Surgeons were once much troubled with the matter of scissors and strings and how to do the operation; now they concern themselves with what the trouble is, what to operate for, and what the result of the operation will be; also with larger physiological and diagnostic considerations. A similar condition obtains in the instance of general radiography. X-ray work was founded as a specialty based primarily on a technical art and a special medium of interpretation. Now roentgenology is gradually assuming a closer relationship to clinical medicine through which association only it can be utilized to best advantage. While there will always be a great place for the general x-ray work the greatest advances in the future will be made by those following special branches of x-ray work, closely connected as subspecialties with clinical medicine and the patient. In dentistry I cannot but feel that we all sense the same movement. In dentistry subspecialties have developed, orthodontia, prosthetics, radiodontia, and developments have fol-

\*From a lecture before the St. Louis Dental Society and Raper-Simpson School of Radiodontia.

lowed through contact with such subjects as general stomatology, metabolism and embryology as related to oral problems and other broad medical considerations.

Dentistry, developed as a mechanical art, has felt the contact of other influences and is gradually being brought back to medicine, a part of which it is. Dentistry is no more apart from medicine than ophthalmology or laryngology. The same principles obtain as to surgical procedure, asepsis, and prophylaxis; the same problems present, requiring close observation, mature judgment, rational therapeutics, and technical skill.

The elevation of American dentistry has been a remarkable thing. It is a privilege to address members of a profession that occupies such a commanding position. I remember when in Europe being surprised and taking pride in the sign "American Dentist" seen so frequently in European cities. The American dentist occupies a unique position. This position, the world's leader in a branch of medicine, has accrued in the past largely through mechanical accomplishments. To run ahead of my story, if the American profession is to maintain this position it must grasp the next opportunity, must espouse considerable subjects in large manner medical, consider them, digest and utilize them to a greater degree than previously. I refer to such subjects as physiology, bacteriology, metabolism, medical economics, general surgical principles, and especially the great doctrine of prophylaxis.

The setting that has determined and necessitated this new adjustment between dentistry and medicine has been brought about by a number of factors: General acceptance of the practical application of bacteriology. The better understanding of digestive diseases through more exact knowledge of alimentary physiology and the resulting appreciation of disturbances of motility as the essential factor in such; a position largely resulting from the wonderful illuminations of gastrointestinal roentgenology. In less measure better appreciation of the influence of abnormalities of secretion have aided. These advances in gastroenterology have resulted in an appreciation of the importance of the oral appendages—teeth, and consequently of the importance of their care and conservation.

The increasing value of dentistry through its accomplishments has been a considerable factor in bringing dentistry and medicine in closer relationship. This through the growing doctrine of dental conservation, skillful prosthetics, effective dental hygiene and especially prophylaxis.

And now comes another subject that more than any other has helped to develop the situation and makes possible this great opportunity for dentistry and medicine to effect a closer relationship, the doctrine of focal infection. If dentistry needed one superurge to incorporate with medicine it has been supplied by this subject. While dentistry was assuming constantly greater importance as we learned of the importance of teeth and mastication in such conditions as in gall bladder disease, duodenal ulcer, the anemias, achylia gastrica, functional dyspepsias associated with organic condition and the diarrheas, the subject of focal infection made dentistry of still greater importance. While we learned of these things and learned more and more to

have respect for and demand the highest class of dentistry we did not before this have the life and death factor forced upon us so dramatically as we have had since the doctrine of focal infection originated and became a vital issue.

I might perhaps make the subject of focal infection a sort of text for my talk with you since it is the factor before all others that has determined the present situation. The subject of focal infection is not new. Benjamin Rush, the great physician, maintained one hundred years ago that certain diseases had their origin in oral septic states, and since his time there have been other men who regarded such conditions as a primary source of general ill health. The very evident causative association of tonsillitis and valvular heart disease has been known for years. It was not until the last decade, however, that Billings of Chicago and Rosenow of the Mayo Foundation forced the conclusion upon us with such logic founded on definite observations and laboratory work as to make it an almost certain probability that many diseases have their origin in a primary infection in some other part of the body from that affected by the evident disease. Rosenow practically proved this in several ways: first, and most appealingly to physicians and dentists, by relief from a certain disease by the elimination of a distant focus of infection; secondly, by the recovery of a common bacterium from the different sites of infection. Another method, less evident but to the trained scientific bacteriologist furnishing just as appealing evidence, is through certain tests of sensitization.

Most of us at first viewed this theory of focal infection askance until much impressed by some unusual case in which eradication of some primary infection resulted in a brilliant cure, yet were later disheartened because apparently similar conditions in another patient did not result in a cure. By such experiences the weakness and difficulties of the method are manifested, for the theory and its practice imply the elimination of all foci before one can conclude that the infectious lesion is not secondary. Here is a very delicate matter for consideration by the dentist and one that is difficult for him to appreciate, because like any subspecialty dentistry has a tendency—we have no better word—to narrow one's mind to broader views; it has a tendency to accentuate its practitioners along one line. You are not alone the victims of this fact. All other subdivisions of clinical medicine are subject to the same thing. The nose and throat man sees only through his specialty, the gastrointestinalist inadvertently considers everything more or less in the light of his chosen field and the cardiovascular man does likewise. We must have these subspecialties but it does tend to narrow one's mind to limit his field, and we must constantly fight against this.

The adequate treatment of a secondary infection demands the elimination of all possible primary foci of infection. The dentist sees but the teeth, his chief concern, but he should realize that the teeth present only one of multiple possibilities as to focal infectious sites. Teeth afford but one possibility of primary infection, be it through caries, pulpitis, alveolar abscess, or what not. But just pause to consider additional possibilities: The possibility of the infections from the nasal sinuses, from glandular infections, bronchial infections, abscesses of many sorts, the number of infections that may arise



in the gastrointestinal tract as from ulcer, gall bladder disease, colitis, chronic appendicitis, diverticuli, the possibilities of infections in the genitourinary tract, seminal vesiculitis, prostatitis, urethritis, pyelitis, in women from infections of Bartholin's glands and salpingitis. Recall endocarditis, myocarditis, even infections about the finger nails, infected hemorrhoids, fistulae, and the like.

No one knows the exact percentage of cases in which oral septic states are responsible for secondary infectious disease. One man estimates it as 20 per cent. Dental infectious states are indeed a major possibility but they represent but one. I hope in no way to be misunderstood as decrying the idea of local oral infection as a source of secondary systemic infection, but the thing goes too far. We are constantly meeting with instances in which the dentist without knowledge of general medical conditions has urged extractions and the like on the presumption that a perhaps obvious dental infection is the cause of a systemic disease. Only a week or so ago an exodontist urged the extraction of a last not very obviously infected molar in an elderly gentleman who was a patient of mine with the assurance that its removal would cure his rheumatism; the previous extraction of the majority of his other teeth by the extractionist having failed to do so. The man had a bad chronic appendicitis and an infected gall bladder containing stones. A few days later he—the patient, not the dentist—was in an insane asylum. His pain, his rheumatism, was the premonitory expression of a severe central nervous system disease having nothing to do with gall bladder, appendix, or teeth.

The whole tendency at present is to accept the theory of focal infection. Evidence is constantly accumulating in favor of it and in the present light of the attitude of the medical profession I should certainly urge that you espouse it. I think that those who accept it will win by such acceptance and failure to do so will be a misfortune and result in a sort of division between the sheep and the goats.

What should be the attitude of the dental surgeons toward this question of focal infection and its relation to oral sepsis; toward the matter as a general medical problem and toward the question of the physician? It seems a great mistake for the dentist to infer that oral infection is necessarily the source of a distant infection as unfortunately is sometimes done. We have had some not altogether consoling experiences along this line. Recall the sheer problem of the medical diagnosis of general disease expressing itself through disability, pain and discomfort that may or may not be of infectious origin. Recall if you will some of those that are known to be secondary to a distant primary focus of infection aside from those other numerous conditions that may simulate them. Heart and circulatory conditions, endocarditis, arteriosclerosis, pericarditis, osteomyelitis, neuritis, herpes, appendicitis, cholecystitis, peptic ulcer, colitis, and the greatest incapacitator of all, chronic arthritis.

It seems that the only rational procedure is towards a closer relationship of the dentist and the medical man; the dentist viewing the medical man as

a consultant and the medical man taking great pleasure in regarding the dentist in the same way. With reference to this matter may I recall again, first, the multiplicity of sources of possible focal infection and the great diagnostic general medical problem as to the possibility or probability of an illness being one that might have originated from a primary localized infectious focus. Second, the difficulty of determining such a focus to be the primary cause, which implies the eradication of all possible sources. Third, the judicial problem as to whether a given focal possibility, of which the oral field is but one, should be dealt with radically or conservatively—this in the light of general medical conditions. This latter is the crux of the whole situation. In one patient known indeed to have a certain not active secondary infection but with a severe digestive disturbance such as achylia, mildly questionable teeth might best be let alone. Artificial dentures still fall short of Nature's provision. In another suffering from a highly dangerous or incapacitating illness, every remotely possibly infected tooth should be removed without thought of conservation. Every conceivable variation of the problem presents influences by social and occupational considerations. Who would recommend radicalism as to the incisors of a famous singer without just cause? Who would suggest conservatism when a patient was becoming totally incapacitated and bed ridden by arthritis deformans? Who would recommend elaborate conservative dental surgery in a person stricken with a not obvious but fatal disease? Who should pass on these questions? Dentist or physician? I leave it to you that the answer is obvious.

The principle under consideration, whether the dentist should act as medical man in any capacity, we will review very broadly. Since not entirely subscribing to the doctrine that the doctor should keep out of the mouth entirely, we cannot hold that the dentist should keep out of the rest of the alimentary tract. I have not the slightest feeling about the dentist's attempting a medical examination; a certain amount of medical experience would be a good thing to keep him in touch with medicine. But you say the trouble with dentistry now is that it is split into a dozen subspecialties just as the medical profession is split in scores of different ways. You see the difficulty of a dentist's mastering all his own subjects; how can he add medicine to his repertoire? Any field of dentistry is amply sufficient to occupy the most brilliant man; the same is true in medicine; no man can cover all specialties; if he becomes familiar with one branch he has accomplished all he can do. To repeat: it does not seem the part of wisdom for the dentist to attack general medicine. His eye and good sense will serve him better than any sort of medical examination that he may be able to accomplish.

When a case comes up where a patient presents an obviously medical-dental problem it does seem to me it would be well to ask for medical consultation. The patient should be advised to consult his physician, and if he has none to get one. He should be further acquainted with the advisability of having his medical man consult with his dentist. There is nothing unethical in the dentist sending the patient to a medical man in whom he has confidence and who he knows will cooperate with him to the patient's advantage.

Doctors more and more refer their patients to other physicians for help in special lines. Of course good sense is in order. If the patient, as is usually the case, is apparently a perfectly healthy individual and believes himself to be, the dentist should obviously act according as he always has, dealing radically rather than conservatively with actual and potential oral septic conditions.

There are certain other subjects I might speak of to you. The question of focal infection leads to the question of radiodontia, a subspecialty of dentistry; how to use it and who should use it. Medicine has gone through these problems, problems analogous to those that the dentist is meeting at present. General roentgenology does not attain to the ultimate development or full utilization of any of its possibilities. If this be true of general roentgenology it is even more indisputably true that medical men cannot effectively attack x-ray work. I feel that in dentistry you will discover a similar situation for yourselves. The better method is to have certain men of your hospital group of men who limit themselves to x-ray dental work do that work. It is not a mere matter of looking at pictures and reading them. Any division of roentgenology is an art having a medium and technic of its own. Of course there will have to be a certain amount done by dentists in smaller places and even among certain groups in larger places, but I cannot help feeling that you will discover it is not wisest or most effective in the long run. Do not underestimate the rapidity with which the public learns of these things. For the first year or two people are quite ignorant in such matters, but in a few years they will have learned that x-ray dental films are not the equivalent of accurate diagnoses and wise judgment; very shortly they will learn that it is the man who stands behind the gun who is the valuable and responsible person. It will not redound to the credit of any man to do other than highly skilled work in any line.

There are certain other things I might speak of with regard to x-ray work. I understand from various members of your profession that you are troubled with commercial x-ray men, that they do, as they always do, inferior and half-hearted work and do not seem to consider themselves obligated by the ethics of the profession. In a certain way you may be responsible for this. In looking over dental literature I noticed the matter of fees frequently discussed. In medicine we do this in perhaps a little less obvious way. I should be surprised if there were any great remuneration in x-raying teeth. It is time-consuming and nerve-racking work. Considering also cost of equipment, material and assistance, of necessity a man must charge a respectable fee for his work. But a dignified fee in a measure precludes the utilization of radiodontia by a great many people. Most people are poor. The solution reached by medical men is that we must espouse some method of quantity production—I am speaking quite frankly—and be contented with small individual remuneration and in turn gain advantage by larger volume. As a matter of fact this is the paying thing in the end as evidenced by almost every other activity in which it has been utilized, from Henry Ford's on down. You have not yet solved this problem in dentistry. We perhaps



have found its solution in medicine through pay and free clinics and reduction of fees. In private the practice is to send a bill for a certain standard fee and if necessary have an understanding with the patient that his fee is individually and confidentially reduced from this standard on his inability to pay this standard. There are great difficulties in the way of this procedure in x-ray work, which requires considerable outlay for equipment and material and the utilization of persons of high skill and judgment in making x-ray negatives, necessarily expensive. The production of x-ray negatives of high class is difficult. A few years ago we heard of the reduction of the x-ray into a mechanical art in which any girl could by certain formulae produce pictures equal to those of the master; but that production has not materialized. The question of individual judgment based on anatomical conditions and penetrabilities is just as active as it is in the question of what sort of dental procedure is best in the instance of a certain person. Perhaps the best outlet in the future will be through endowed institutions, pay clinics and large groups, in which specially trained, skilled and well paid technicians could be developed to do the technical work, economy being effected through the saving of time to the accomplished radiodontist who would thus be enabled to pass on a far larger number of cases than if he did the mechanical work himself.

The question of prophylaxis in dentistry is a most pertinent one. To the physician, the dentist hardly seems to take advantage of his great opportunity to teach prophylaxis. We certainly come into contact with many persons who have no knowledge of the proper way to care for teeth and gums. I would not have the temerity to state before this body how many patients of how few seem to have been instructed by their dentists as to the proper means of dental prophylaxis, or how many consult their dentists at fixed intervals, though in this the patients may be largely to blame. I have sat down with hundreds of patients and shown them how to massage the gums with a tooth brush, people who had never heard of such a thing, yet whose mouths showed full familiarity with the dentist in other lines. Prophylaxis is the humanitarian thing to teach and is operative along the same lines as quantitative production. It will be remunerative in the end if one cannot look at it in any higher light. Since this is doubtless an old saw with you, let me at least make the statement that instruction in prophylaxis appeals to the physician, especially the internist, very much indeed.

I have made a few scattering remarks. The subject is great. I might elaborate in any direction. Dentistry is not a separate art but a part of medicine, and it will surely in the future return to medicine as an integral part. I cannot but feel that those who take this broad view of the subject and grasp the present opportunity will benefit greatly.

#### DISCUSSION

*Dr. Clarence O. Simpson.*—It is rather hard to discuss a paper with which one entirely agrees. I have been in touch with Dr. Mills for quite a time and am familiar with his views on this subject, and he has tried to express them very moderately. He has decided opinions upon many of these subjects, but in his modesty and desire not to be aggressive, he has merely touched upon them. There is no question but that any thinking member of the dental pro-



fession who is abreast of the times agrees with the majority of the statements that he has made. Dentistry is a part of medicine and it is lamentable that we have not had the opportunity to be in closer touch with general medicine. I believe if dentistry were given that opportunity it would be accepted, but whoever was originally responsible, the condition at the present time is such that the medical profession does not receive the greatest benefit from the dental branch, and dentistry has been compelled to work out many of its important problems alone while she might have done it in connection with specialists in other lines.

Doubtless all of you have had the experience of trying to solve some technical problem and finally having seen the light by casually meeting and discussing this subject with some one in some other specialty, perhaps some one entirely out of the profession; perhaps some one in an industrial or purely mechanical line has helped you to solve the problem which has puzzled you for a long time. In practising one subspecialty I have had the experience of getting great benefit in discussions of mutual problems with members of other specialties, because they are so closely related there is bound to be mutual advantage from association and cooperation. This is true in the relationship of general dentistry or specialties of it and the specialties of medicine.

Dr. Mills has correctly stated that the internist is the one man who is responsible and by whom recommendations as to procedure should be governed. The dentist sometimes has felt that the medical man was interfering with the specialty of dentistry. From contact with some of those men I do not believe they have ever had that feeling about it; they would much prefer that the dentist assume the responsibility for the oral cavity and care for it properly. The trouble arises because some members of the dental profession do not do this. The physician has been compelled for the welfare of the patient to investigate these matters of his own accord. The tendency of dentistry to broaden and to view dental practice as a part of medicine—to view the mouth as a part of the body—is rapidly changing that source of friction; there will be less of it in the future.

Dr. Mills is competent to speak on radiodontia because he was compelled to practice it for a number of years. He was a pioneer in St. Louis in recognizing the far-reaching effects of oral sepsis, and for the benefit of his patients he practised radiodontia in connection with other work for many years. He very easily suggests the economics of this practice should be solved. The economics of any profession should be solved, but no solution has been found. Whenever the work is lowered to a fee where the patient cannot be given the proper attention, it is a question whether the patient gains or loses by the economic solution. The x-ray laboratories, as we know, have turned this work over to technicians, to ignoramuses who had no investment in education, no previous training, who were satisfied with inferior results and a remuneration of five or ten dollars a day as an artisan. The service resulting from these examinations is inferior, and an inferior or incorrect diagnosis is probably worse than none at all. It is a debatable question whether the patient is best served by cheap service or none at all when diagnosis is involved. We are constantly called upon to make dentistry cheaper, but we ought to make dentistry better and more expensive, and there is no way to reconcile these two tendencies. It could be made better and could be made cheaper, so that the problem will probably remain unsolved. Those financially able to have diagnostic and reparative service will demand it and get it, and those unable cannot get it unless it is under government control because none of us who practice are financially independent. We are dependent on our practice for our livelihood and it cannot give us that livelihood unless we have fees that compensate us for the time employed. That is even more true in general practice than in a specialty because the general practitioner in trying to do many lines of practice has the time problem ever before him. It is impossible to accomplish everything in a working day; it is impossible to serve a large number of patients, and under the present fee scale I know of no dentist who becomes wealthy. They are underpaid rather than overpaid. I know Dr. Mills has no solution but I wish he would stop bringing up the problem.

The only solution is in the establishment of clinics by men who have the money; philanthropists will have to supply the money, the men serving it get a remuneration, and

patients get the best service. It can be so governed that only those worthy can partake of it, it could not be done in private practice.

*Dr. Torber.*—Some of the gentlemen asked me to say something about this problem so I will ask you to excuse me for my language. People today mention prophylaxis, and that is what we ought to think about because prevention is better than cure. I think prophylaxis ought to begin, not with the child, but with the fetus. During fetal life, the fetus takes a great amount of calcium and other salts, but if we look at the mother's diet we find it is not very abundantly supplied with lime salts. According to Charmond in New York, the average American diet is very short on lime salts; he figures that the average man takes .68 grams of calcium per day. The child of course takes much more to build up its bones and teeth. If we go to the mother at the time when the teeth are formed, we will see that the calcium is not sufficient, for the fetus needs the lime and it could take it through the mother's diet.

I read an article the other day about this problem. The author estimated that the fetus had taken about 30 grams of calcium, and he had followed the mother from the seventeenth week to the end of pregnancy. This mother was fed a liter of milk a day containing 1.7 grams calcium and had not been able to retain more than 4 grams during this period. The average diet is about .68 grams of calcium a day, so it seems to me the average mother may be short of calcium.

When we look at the teeth during pregnancy we find that they become badly decayed. There must be some connection between these. The fetus needs the calcium and takes it from the mother's bones and teeth unless the mother is nourished properly. I do not think it is caused by the acidity of the mouth, but by a metabolic disturbance—and this may be the cause with the ordinary decay; it may be lack of calcium salts in the diet.

The hospital at Washington University has been doing some very interesting work along this line of metabolism in infants. They find that calcium is negative in under-nourished children during the first month of life. During the period when the second teeth are found, when the calcium balance is negative, the teeth could not be formed properly. I think dentistry will have to change a little and think not only of this local cause of dental decay but more of metabolic process. There are two processes going on, one inward and one outward, and the inner one may be changing the organic structure of the tooth; that is the way that the inorganic salts have very much to do with the whole metabolism. A disturbance in calcium metabolism will cause a disturbance in the whole metabolism, and it may be that a very great lack of calcium will produce an organic change in the matrix of the tooth.

Of course it is very important to clean the teeth, to keep the mouth clean, but that is not the only problem; we have to look at the diet, and in coming to this problem we cannot do it alone; we have to work together with the physician. I think that by working together with the physician we may be able to do something. We cannot do it alone and the physician alone could not prevent caries; he has to work with the dental profession. It is a great question whether the dentist should be a medical man too. I do not know what to say about that, but I do think the dental profession has to learn more about medicine, especially physiology and biological chemistry, because it is along that line we may be able to solve many of these problems.

*Dr. Elmer Olds.*—I appreciate what part of Dr. Mill's paper I heard very much. It seems to me that the two most important considerations have been left out of the discussion entirely. They have talked about nutrition, which is one of the most important subjects in the prevention of dental caries and disease of any kind, but the two most important have not been mentioned. I did not hear all of Dr. Mill's paper; perhaps he did mention it.

The first is sunshine, the second is exercise—there is a third, rest or recreation; three very essential qualities. Leaving those three out, you might as well leave out the fourth which is nutrition. Nourishment of course has to come both from within and from without. If you have one without the other, neither will do the most good. I have been working along preventive lines in dentistry for about ten years. The longer I work along those

lines, the more I find I do not know about some things, and more about others. I find that plenty of sunshine, fresh air, proper rest and nourishment are the very essentials in the prevention of disease.

*Dr. Otto J. Fruth.*—It is rather refreshing to hear a medical man say that dentistry is a part of medicine. It is only a few years ago that it was considered a joke when we considered dentistry a part of medicine but now, say within the last ten years, the medical profession has looked upon us as the skirt behind which to hide perhaps. I think it was at the last joint meeting of the medical society and dental society that one of the members told us all the terrible mistakes dentistry had made and the number of deaths which had been caused by poor dentistry. He had seen root canals filled to the apex and way beyond. The x-ray had shown all that. We admit that the x-ray has shown our mistakes and they have proved a monument to our ignorance, but the mistakes of the medical men are always buried.

Some years ago when the emetin craze took hold of the country, a joint meeting of the medical society and dental society was held, which was well attended by the medical profession, and after it had been shown that by injection of emetin, pyorrhea alveolaris could be cured, the medical profession began to treat pyorrhea, which they eventually gave up. The work that has been done in roentgenology has been a great aid to us, but for a while there was a craze for the ruthless extraction of teeth, due mostly to the medical profession. This was usually the case when medical men did dental radiography. I have had cases referred to me with films showing perhaps six or eight teeth with so-called granulomatous areas with the recommendation that they be extracted. Upon examination of the case I could find nothing wrong although the films were marked as having granuloma and all sorts of infection. The interpretation of x-rays has been a great deal of aid to us. We know that Dr. Simpson on his charts always asks what information is desired and in that way he gives it to us.

The matter of fees is always an amusing one if nothing else. No doubt all of you have had the experience of having a patient referred to you by a physician, who after treating for some months with no results states, "There must be something wrong with the teeth—go easy; he hasn't any money." I sometimes remind the medical men that if they would send the patient to us first we would have a chance to get some money before they get it all. We are willing to work in conjunction with the medical profession and the sooner we can do it and the more we can do it, the better for the profession and the patient.

*Dr. William Conrad.*—I wish to compliment this gentleman for the very mild and interesting style in which he has presented this subject this evening. It certainly has been against my rule for many long and weary months to stay at this dental society this late, but it was interesting. This wave of investigation that has been passing over the medical and dental world has been a means of great good in broadening the thoughts of both medical and dental men, and when the final settlement comes, I believe that the whole problem will be settled by preventive dentistry, commencing even before the infant is born and carried on until the full development of the dental tissues has taken place. Prevention, gentlemen, is the only solution of this whole subject.

Percy Howe read a paper before this society some months ago, and during the presentation of the subject, he showed slides upon the screen—most terrific conditions from feeding. Diet! diet! God help you in preventing children from being reared on diet. Examine the mouths of everyone here tonight and what would be the result. Calamity! and yet preventive dentistry is just as positive in its results as that the sun will rise tomorrow morning in the east—provided it is not cloudy.

*A Voice.*—It rises just the same, doctor.

*Dr. Conrad.*—But probably some of you fellows haven't polished the teeth for three or four months and you couldn't see them. That is the point that I wish to make this evening, that it is just as sure and just as positive in its results if you practice it and insist that the family and patients follow it. Dental caries is a dirt disease—only comes that



way. After a tooth is devitalized you have a form of necrosis or gangrene of the roots; but I wish to impress upon you gentlemen—and it has been agitated by me for some time—they become too wise when tooth polish is unnecessary and all you have to do is to feed them. Don't omit the tooth polish.

*Dr. B. E. Lischer.*—I didn't come prepared to discuss this very big subject, but I agree with practically everything Dr. Mills has said. I think he delivered it in a very comprehensive and calm way without any prejudice and stated a great many facts. All of us who reflect carefully upon the problem that confronts us must come to this one conclusion, that dentistry has developed its technical aspects about as thoroughly as can be expected with the means at its command, and that its technical methods have been tried over and over again and have been found wanting.

The profession reminds me of the fellow who lived in a greenhouse and threw stones at the panes and later replaced them. We are patching up mouths, and I don't think we need be ashamed of the way we are doing it. We acquired it mostly by our own efforts in spite of the crime of 1839 when we were told we had no rights in the medical faculty. We have no feeling about that point. It is useless to have now.

To those of you who do not see the Dental Cosmos, I would like to say that in the May number there appeared an article by Dr. Michael Davis, Ph.D., of New York, who does purely research work. He was asked to make a survey of the dental needs of many communities of the United States, and he reports those findings in the May number. If you will drop Dr. Davis a line he will be pleased to give you the whole survey, and there you get the problem which stares us in the face, which Dr. Mills has merely hinted at tonight. It will take the entire dental profession to take care of the adults with the minimum amount of service, while our main service should be to the children, and for that we are unprepared. Dr. Davis is not a dentist or physician but a doctor of philosophy who has had years of practice in examining conditions along this line.

I think dentistry has arrived at the threshold of universalism and it cannot be served by subspecialties, but there must be a concerted action on the part of the people. A good deal of this service should be supported by the public, we ought to hold ourselves ready to cooperate when that time comes. At the present time there is a survey of dental education promulgated by the Carnegie Foundation for teachers. That will come out in print shortly and in view of that it would be unwise to say anything about education. It is a great problem, and easy for anyone to say what dentistry lacks, but how are we going to solve it? There is such a thing as educating a man highly in medical science. Is it wise to keep a man until he gets his M.D. before taking on dentistry? There is such a thing as keeping him too long to acquire that dexterity he needs in the dental profession, and too long before he can earn his own livelihood. Dental men cannot solve the problem and medical men cannot solve it, but all have to cooperate. I am not saying they are going to be solved this year or next year, but the process is going on and we ought to help.

*Dr. Conrad* scoffs a little at the idea of diet, yet there are races found to be immune to dental caries who have not known the toothbrush. It is our modern life; just what we cannot exactly say. Dr. Olds has suggested a remedy along physiological lines. But in addition we ought to know something more. The future practitioner of the specialty I have the pleasure of being in will have some knowledge of pediatrics, physical diagnosis, anthropology, and certainly of nutrition because mechanically it has almost played out.

*Dr. Conrad.*—There have been so many things to talk about tonight that I can't keep them quite together. About thirty years ago or more this question of dental-medical education was very active, and the Chicago Dental College was organized for the purpose of making medical dentists and they continued doing so for four or five years, and they found it didn't work, and the Chicago Dental College has continued a plain, ordinary dental college ever since. The question of medical and dental education and all other forms of education—high school, university, etc.—is the liveliest topic, outside of the teeth, that we have.

*Dr. W. L. O'Neil.*—I certainly enjoyed the paper by Dr. Mills. I hardly agreed with everything he said. There is one thing that Dr. Mills said: he criticises the dental profession



for not teaching preventive measures. I believe that every live wire in the profession is doing that, and I find that the medical profession is not doing anything along that line. Just try it. Ask those patients how they have been taken care of. If our own teaching hasn't done much good, a great many haven't received any advice from the medical profession. They go to a hospital and lie there for weeks without any oral prophylaxis. When a patient of ours is sick and confined to a hospital, we are the last people ever thought of.

Dr. Tober talks along the right line. He expressed my ideas very well. I don't agree with what Dr. Conrad says. I preach oral prophylaxis, I guess as much as any man in the house, and I preach diet too, but it is not enough to preach diet alone so we preach them all. Emetin was mentioned. I took that up and used it for a while, but by no means dropped any of the other means I had. I don't believe it did any good.

*Dr. Mills (closing).*—I must first thank you for very charitable views and favorable criticism that I had not altogether anticipated that discussion has brought out. I am not of your cloth and do not altogether know your method so I had to feel my way. It seems that the discussion has been much more valuable than the address. If I may be allowed a little comeback on one or two points before my get-away, I shall indulge.

About Dr. O'Neil's criticism that medical men have been derelict as regards oral prophylaxis, I might hedge by suggesting that it has been so indicated that we keep out of the mouth that we have some hesitancy in doing anything else. To turn the other way, since dentistry is to become a part of medicine you must all take lessons of our common mistress, so if you are to be a part of medicine you must allow the teachings of medicine in general. It is true that medical men have been guilty of not discouraging oral sepsis but the deficiencies of some dentists along this line are also apparent. I simply gave it as my personal experience that I had seen very few patients who had been instructed by their dentists in dental prophylaxis. The first thing patients ask when being instructed is, "Why didn't my dentist tell me?"

I am a little ashamed to say that it was a surprise to me to hear the question of prophylaxis and preventive medicine discussed so much by you. I guess we have been a little narrow in thinking of dentists as those who minister to the mechanical affairs of teeth. Of course the great questions are prophylaxis and preventive medicine, and these lead to the great ones of the relation of preventive medicine to anthropology and the still greater one of eugenics. It has been remarked that uncivilized people suffer the least from caries. This is true, but we cannot draw a parallel between them and the people living under civilized conditions. The savage gets massage for his gums from the coarse food he eats and his resistance is high owing to his more natural life. We who live under conditions of what we call civilization are all sick. Not one person among us but shows the marks of disease. We think of certain superficial evidences of decadence, the hair turns gray, we must wear glasses, and we discover a certain amount of pyorrhea. We imagine everything inside is all right, and are shocked when we learn that we have chronic appendicitis or gallstones. But the same retrogression occurs inside as well as outside. There is hardly a normal appendix; the gall bladder is usually a little inflamed; there is probably a little pyorrhea present in all of us. We are all focally infected. We tend toward the conservation of diseased structures through our whole propaganda of treatment and prophylaxis. What will be the result in a few more generations? Careful anthropologists tell us the whole human race is becoming decadent. The bones are becoming lighter, the little toe has largely lost its function, the third molar is progressively less developed, and at the rate the cranium is growing in a few generations it will be impossible for a child to be born without the aid of instruments. Is there any answer? We can only hope that the future will find the solution. It has been human history that every problem finds its solution as it arises. Perhaps in the years to come reason will so be developed as to furnish the solution through practical eugenics, control of mating through education, and in this way control the situation and perhaps ultimately produce the superman we think of. Of course this is all nebulous. Certainly we shall do well to follow along the lines of preventive medicine and trust our followers to solve their problems.

Dr. Simpson has spoken of my work in radiodontia. In extenuation I might say that a number of years ago when I first realized its importance I could interest nobody in the work. I went to the x-ray men but it did not appeal to them. I couldn't command a complete set of dental films in St. Louis. I had an x-ray laboratory so the natural thing to do was to take it up myself. Later as Dr. Simpson and others developed it and because they had the ability to judge the films from a dental standpoint I was glad to give it up. Radiodontia is really a dental field.

Since we all love a bit of a fight, I want to speak of Dr. Simpson's attitude toward the question of fees. It has been the consensus of your meeting that the subject of prophylaxis and preventive medicine is a great one, and the trend of things is in that direction. I cannot ascribe to a doctrine, that does not, it seems to me, coincide with this movement, that leaves out the great majority of people because they cannot pay. It is true I did not offer an effective solution; I hoped you would have it in your pocket. I did mention the case of Henry Ford. I cautiously suggested that by quantitative production we might be able to get a start in the right direction. As far as this attempt has gone in medicine in supplying the needs of persons who are unable to pay full fees it has been a success. In certain large clinics as much as 60 per cent of the work is at least partial charity. They have a sliding scale and make no bones about it. Locally we have attempted to solve this problem at the Barnes Hospital by a pay clinic—with much criticism from certain practitioners and doubtless some injustice to them. Yet at the Barnes Hospital a poor man can have just as good a gastrointestinal examination as a millionaire; perhaps better, because one does not have to propitiate the poor man and can examine when and as he will. The idea, so far as we have worked it out, seems to be success. A fee is paid by everybody who can. A patient who can pay five dollars to cover the expense of a gastrointestinal x-ray examination does so. The same if a ward patient. A private patient pays a technical service fee of ten dollars just as an operating room fee is charged and in addition a fee for consultation to the medical man. The laboratory at that had an income of \$30,000.00 last year paying for all expenses including salaries. It very strictly does not try to earn money. Though those of us who are connected with it do not now do the mechanical work ourselves, we formerly did. I took every plate in my department myself until the last year. Then we got girls of the best class we could command. They can be taught to do very fair x-ray technical work. While they cannot perhaps do the most artistic type of work it does seem to me that the plan furnishes the greatest good to the greatest number. A Ford is not a Peerless or Pierce Arrow, but I dare say many think it preferable to not going at all. I cannot but believe that it is better to supply the country with a technically slightly inferior quality of work and so give a vast number of people something highly useful to whom nothing would be available otherwise. If you take a man who is familiar with x-ray work he can look over a large amount of stuff if he can get away from the technical time-consuming drudgery. It seems to me this is the most effective way to combat the commercial laboratory. If Dr. Simpson has a competent technician, even though he could not produce quite as exquisite work as the doctor is known for, he could look over and pass on fifty cases a day, and greatly increase his usefulness and capacity for service.

## ***RADIODONTIC RIDDLES***

**Conducted by Clarence O. Simpson, M.D., D.D.S.**

**A Department Devoted to Discussion of the Scientific, Technical, and Ethical Problems  
of Radiodontia**

### **Razzing the Jazzvertisers**

**Q.** Why does the nice looking young lady in the advertisement bite the x-ray machine? And when you answer, would you mind leaving a little hide on?

**A.** Young ladies are impulsive, and some of these camouflaged x-ray machines are so attractive that the girls just cannot control their feelings. Furthermore, the girls are not the only ones who "bite" on the trick x-ray machines; a lot of dentists, looking for easy money and fancy fixtures, rise to the bait of "it will pay for itself and give you a large profit with your assistant doing the work."

The mushroom companies manufacturing or assembling toy, "fool-proof" dental x-ray cabinets have such contempt for the intelligence of dentists that they bid for business with freak designs. Some are patterned after nursery furniture, so games with amusing characters may be improvised to make "radiography a lark" as advertised; some are designed like customary pieces of furniture to conceal the purpose of the apparatus and bring a delightful surprise to the patient when the joke is so cleverly revealed; while others appropriately but unintentionally display a grim humor in resembling a contrivance for an execution.

For illustration, there is the phonograph model for the musically inclined, just as decorative and less expensive in operation than its prototype, since no records will be broken in using it.

The megaphone type with which the patient impersonates a cheer leader, the effect being made more striking by donning "rah! rah!" costume and having a wardrobe of all college colors so the patient may represent a favorite college. This game may be varied by having the patient announce through the megaphone that Mabel is batting for Raper, or ask whether there is a doctor in the room.

The telephone bracket design which combines with the deceptively familiar arrangement a sinister touch in presenting a bayonet or projectile pointer or a blunderbuss muzzle.

The dog-house style, before which the patient squats in supplication for a bone; but in contrast to the doleful nonproduction of Mother Hubbard, "bones" are "pulled" with great and high frequency.

The various modifications of the gallows and guillotine types, with which the black cap for the patient and a fool's-cap for the operator is optional but lends character. A suspended noose around the patient's neck adds to the realism of the entertainment and reduces the objectionable vibration in the superstructure.

The bung-hole technic for which the patient looks, listens, or smells in a mahogany barrel, is claimed to be quite harmless, presumably because the contents does not exceed the legal  $\frac{1}{2}$  of 1 per cent "kick." To one unfamiliar with its peculiar operation, there seems a probability of embarrassment to a modest "stylish stout" lady in a tight skirt when posing for the lower incisors.

The electrocution chair, with the high voltage transformer under it, may be upholstered to match the other furniture, and made useful as a seat while adding to the effectiveness as a decoy. When used for games the fun is increased by strapping the hands and feet and conducting a little static to whoever is "it" and sits in the chair.

The piscatory model to which you referred is quite popular with sportsmen for indoor training during unfavorable seasons, as considerable skill is required to hook and land the catch with it. Owing to the prevalent use of "smokeless" or "eatin'" tobacco among males and spearmint gum among females, it is advisable to wipe the hook and apply fresh bait before each cast. The bait should be selected with regard for the supposed taste of the species for which you are angling, lolly-pops, ice cream, "hooch," and garlic being a small efficient assortment. If the directions are followed this machine should prove quite diverting to the operator, and when patients enter into the playful spirit of the sport they may be assured of the appearance and sensation of the poor fish.

The handwriting on the wall and the imitation typewriting on the circular letters indicate that the lucrative enterprise of duping dentists with near x-ray machines is dying from overwork. The recent competitive stroke is offers of machines for a small cash payment of \$50 and upward with the balance in monthly installments extending over two years, one philanthropic company stating it has such confidence in the satisfactory returns that it is willing to risk 90 per cent of the investment, to the 10 per cent risked by the dentist. An installment sale with probably 50 per cent profit, protected by a chattel mortgage and drawing interest on the deferred payments displays pathetic faith in the transaction. A few more comedy "props" will be produced, and the threatened "kodak" machine to hold in the hands may materialize so one may be had in every home to forecast when baby is "cutting" a new tooth, but the radiographic equipment of the future will be the conservative efficient apparatus supplied by responsible, experienced manufacturers.

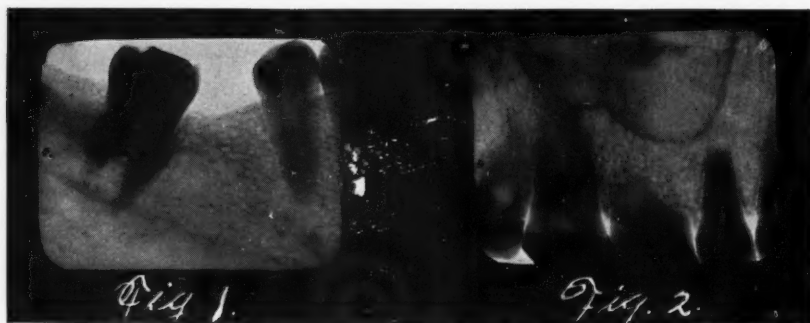
In reply to your reference to the conservation of hide, the present status of radiodontia and dentistry in general shows the ill effects of letting Nature take her course instead of resorting to the knife. The epidermis has been allowed to proliferate at the expense of the heart until we have professional Pachyderma and industrial parasitic Crustacea impervious to ethical or social



regulations, and heeding only the criminal code. Since rational therapy does not prescribe ointment for callus, and platitudes have never corrected abuses, your indulgence is craved in the subcutaneous treatment and amateur taxi-dermy of radiodontic riddling.

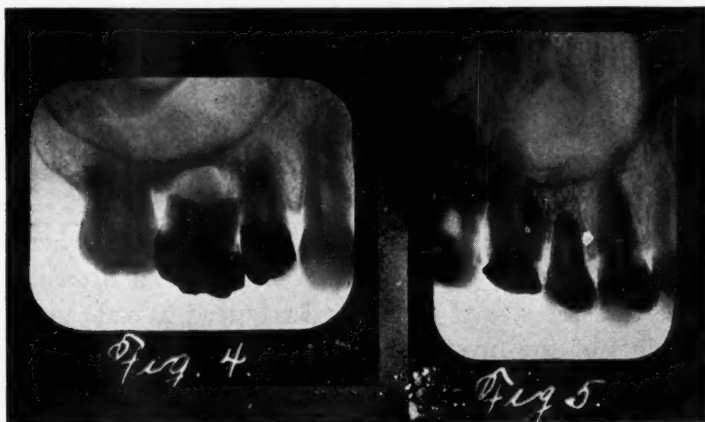
### **Radiculararities**

**Q.** What is the explanation for resorption of the roots shown in the accompanying films? The first molar, although apparently vital, was extracted because of pain in this region, the neck and shoulder. Half of the bicuspid root is gone, and it appears that resorption is occurring on the distal root of the lower molar.



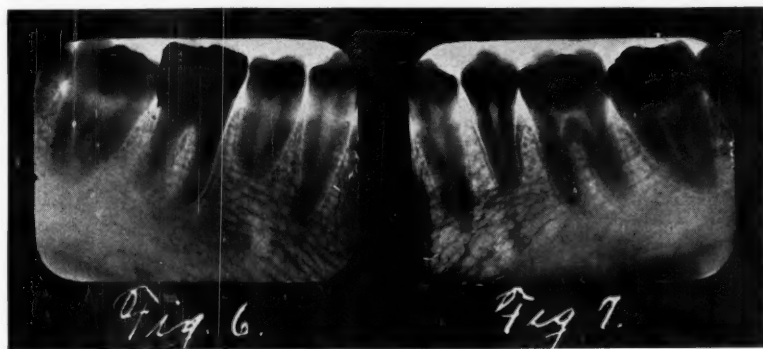
**A.** There is nothing in the radiographic evidence or history to indicate that the roots of these teeth have been resorbed. Since the teeth apparently contain vital pulps and there is no indication of local pathology or trauma, the condition is probably the result of incomplete root formation instead of erosion. Such hypoplastic anomalies are occasionally observed, although this molar is an extreme example. The theory of arrested development is strengthened by the lamina dura being shown around all of the roots except the lingual root of the maxillary molar, and it might have been possible to demonstrate it there. Were this absent, the possibility of destruction by perverted osteoclastic function would be admissible, since it occurs in retained deciduous teeth where the successors are congenitally absent. Additional evidence is offered by the cementum covering the malformed root of the extracted tooth with reasonable uniformity.

In attempting to account for imperfect root formation, altered metabolism during the period of development would be suggested. In this case the condition being presented in the maxillary first molar and the mandibular second molar would tend to exclude systemic disturbance, unless the personal history gives recurring periods of nutritional insufficiency corresponding to first and second molar dentition.



Figs. 4 and 5.—Examples of hypoplastic formation in maxillary premolars and molar. The pulps are vital in the premolars.

The practical significance of these examples of hypoplasia is in recognizing variations of normal development, and considering the possibility of imperfect root formation before assuming that all short or asymmetric roots are necrotic. This warning has been previously emphasized in this department, but as a vital diagnostic point will bear repetition. One of the headliners on the stereopticon circuit has repeatedly stated in his synopsis that



Figs. 6 and 7.—Incomplete root formation with vital pulps in adult patient.

he would draw a sharp line of demarcation between the pulpless teeth to be retained and those to be extracted. The "sharp line" is the condemnation of all "denuded" roots, but since the periodontal membrane may for years resist infection from adjacent bone involvement, the issue must be decided by the radiographic evidence of apical condition. As a diagnostic factor a "denuded" root, which can only be demonstrated postoperatively, is a confusing term intended to daze the audience.

# PATENTS

## DENTAL APPLIANCE, PATENTED OCTOBER 12, 1920\*

**T**HIS invention relates to appliances for use in shaping band material about a tooth, or for measuring a tooth to ascertain the size of band required to embrace the tooth.

The invention has for one of its objects the provision of means for causing a strip of material to closely embrace a tooth.

Another object of the invention is to provide means whereby a strip of material may be expeditiously passed about a tooth and drawn tightly around the same to ascertain the size of tooth band required to embrace the tooth.

Another object of the invention is to provide an appliance having a pair of jaws adapted to grip the adjacent ends of a doubled strip of material and a member shiftable relatively to the jaws for contracting the loop formed by the doubled piece of material held by the jaws.

A further important object of the invention is to provide a dental appliance of the pliers type having a third handle pivotally connected therewith and shiftable in a plane transversely of the plane of movement of the handles of the pliers, said third handle carrying means adapted to contract the loop formed by a doubled strip of material held by the jaws of the pliers.

A further important object of the invention is to provide a reversible and removable band-material-manipulating attachment for dental pliers.

Another object of the invention is to provide a band-material holding and manipulating appliance so constructed that it may be readily adjusted to adapt it to shape band material about either upper or lower teeth at any position in the dental arch.

In the drawings:

Figure 1 is a side elevation of one form of appliance embodying the invention;

Fig. 2 a plan view thereof;

Fig. 3 an end elevation;

Fig. 4 transverse section on the line IV-IV of Fig. 1;

Fig. 5 a perspective view of the band-material manipulating member;

Fig. 6 an enlarged detail view showing the plier jaws open and the ends of the band material in place between the jaws; and

Fig. 7 a view similar to Fig. 4 showing a slightly modified form of connection between the pliers and band-material manipulating member.

Referring to the drawings by numerals, 1 and 2 designate the pivoted lever members of the pliers. The members 1 and 2 are pivotally connected in crossed relation adjacent one end thereof by a pivot pin 3, the longer arms of the lever

\*Patent No. 1,355,790, United States Patent Office.

members being bowed to form handles and the shorter arms thereof being bent laterally at an angle to the pivotal axis of the members to form cooperating offset gripping jaws 4 and 5 closely adjacent the pivotal point of the lever members. The jaw 4, is formed with a stop, lug or projection 6 at its outer end adapted to be engaged by the outer end of the jaw 5 when the jaws are shifted into gripping relation and is also provided with a gripping stud or projection 7 on the gripping face thereof a short distance from said stop lug. The jaw 5 is formed with a recess 8 in the gripping face thereof a short distance from its outer end, which is adapted to receive the stud 7 on jaw 4 when the jaws are shifted into gripping relation.

Fig. 1.

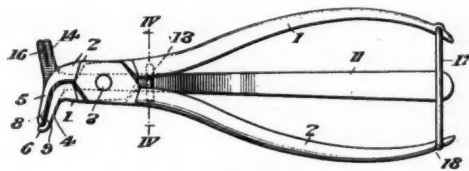


Fig. 2.

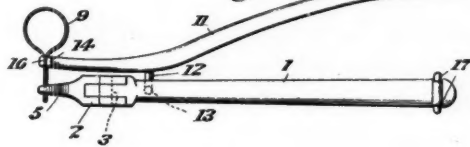


Fig. 3.

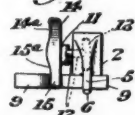


Fig. 4.



Fig. 7.

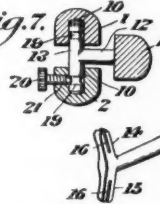
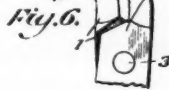
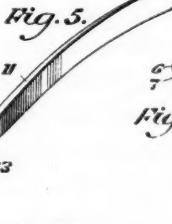


Fig. 5.



No. 1,355,790.

At the opposite side of the pivot pin 3 from the jaws the lever members are each formed with a socket 10 in the adjacent inner sides thereof.

A detachable and reversible tooth-band material manipulating member 11 is adapted to be pivotally held at either side of the pliers. The member 11 is provided with a laterally projecting lug 12 adjacent one end carrying a pivot pin 13 the opposite ends of which are adapted to seat in the sockets 10 on the members 1 and 2 to pivotally connect the member 11 with the pliers to swing about a pivot at a right angle to the pivot pin 3. The longer arm of the member 11 is bowed to form a handle and the shorter arm thereof is provided with oppositely extending portions 14 and 15 forming a substantially T-shaped head. The head portions 14 and 15 are each provided with a transverse slot 16 ex-



tending inwardly from the outer end thereof. The slot in one head portion is in alignment with the gripping faces of the jaws of the pliers when the member 11 is supported at one side of the pliers, and the slot in the other head portion is in alignment with the gripping faces of the jaws when the member 11 is supported at the opposite side of the pliers. One side of each of the head portions 14 and 15 is shaped to conform with a tooth as shown at 14a and 15a.

A locking bail 17 is pivotally held to the handle of the member 1 and is adapted to be shifted to embrace the handle of the member 2 and engage in a notch 18 therein to hold the jaws of the pliers in gripped relation and to maintain the pivot pin 13 of member 11 in the socket 10. The pivot pin 13 is sufficiently long and the sockets 10 are sufficiently deep to permit enough movement of the members 1 and 2 to cause jaws 4 and 5 to grip and release the band material 9 without disconnecting member 11 from the members 1 and 2.

The operation of the appliance is as follows: The member 11 is arranged at the proper side of the pliers, according to the location of the tooth to be fitted with a band, and the handles of the pliers pressed toward each other until the ends of pivot pin 13 of member 11 engage in the sockets 10. A strip of flexible metal 9 is doubled and engaged in the slot 16 of that head portion of member 11 which is in alignment with the gripping jaws of the pliers, and the ends of said strip 9 are inserted between the jaws of the pliers and the pliers operated to firmly grip the ends of the strip. The jaw 5 as it approaches jaw 4 will force the edges of the strip against stop 6 on jaw 4 and said jaws will tightly grip the registering end portions of the strip, the lug 7 indenting the strip of band material into recess 8. The handles of the pliers are then locked by bail 17 and the appliance is inserted in the mouth and the looped portion of the band material 9 engaged around the desired tooth. The handle portion of member 11 is then pressed inwardly toward the pliers, thus rocking the head portion away from the gripping jaws to contract the looped portion of the band material until it tightly embraces the tooth. By providing several of the detachable members 11 and shaping the outer sides of the head portions 14 and 15 thereof to conform with the surfaces of different classes or types of teeth, the appliance is adapted to shape strips of band material accurately about different teeth. The appliance may be used to fit strips of gold or other band material directly about teeth, or may be used with a flexible strip of brass or other suitable material to measure teeth to ascertain the size of band required therefor. The appliance is adapted to draw the metal strip tightly about the tooth and will form permanent bends, creases, or indentations in the strip at the points where the outer face of the head portion of member 11 bears against the side of the tooth.

The jaws of the pliers and the head of member 11 are so shaped as to readily adapt the appliance for use either at the inner or outer side of either the upper or lower dental arch, and the plier members are so constructed that a slight movement of the handles of the pliers will cause the jaws thereof to grip or release a strip of band material.

In the modified construction illustrated in Figure 7, means is shown for positively but detachably securing the material manipulating member 11 to the pliers to prevent accidental separation thereof in handling the appliance. For

this purpose the pivot pin 13 carried by member 11 is provided with circumferential grooves 19 adjacent the opposite ends thereof and a locking screw 20 is threaded through an aperture 21 in the member 2 of the pliers leading into the adjacent socket 10. It will be obvious that the member 11 may thus be positively locked to the pliers, while positioned at either side thereof, by threading the screw 20 inwardly until the inner end thereof projects into the groove 19 in whichever end of pivot pin 13 is seated in socket 10 in member 2. The groove 19 permits the member 11 to be rocked freely about its pivot when the screw 20 is in locking position. It will be obvious that various means may be provided for positively but detachably securing the member 11 to the pliers.

What I claim is:

1. A dental appliance comprising a pair of crossed handle members provided with gripping jaws at one end and pivotally connected together intermediate their ends, an auxiliary handle member having a slot adjacent one end adapted to receive a double strip of material held by the gripping jaws, and means for pivotally and detachably connecting the auxiliary handle member intermediate its ends with the crossed handle members to swing in a plane transversely of the plane of movement of the crossed members for varying the size of the loop formed by a double strip of material held by the gripping jaws.

2. A dental appliance comprising a pair of crossed pivotally connected lever members having cooperating gripping jaws at one end, a third member extending along one side of the crossed lever members, and means pivotally connecting the third lever member to one of the crossed lever members to swing about an axis extending transversely of the pivotal axis of the crossed members, one end of said third lever member being movable toward and from one side of the gripping jaws on the crossed members and having an opening therethrough adapted to receive a doubled strip of material gripped by said jaws.

3. The combination of a pair of pliers having jaws adapted to grip the ends of a doubled strip of material, a lever having a handle portion and a head portion provided with a slot extending therethrough in the direction of movement thereof adapted to receive a doubled strip of material held by the pliers, and means for pivotally connecting said lever intermediate its ends with the pliers to swing toward and from one edge of the jaws of the pliers for varying the size of the loop formed by the doubled strip of material held by the pliers.

4. A dental appliance comprising a pair of pliers having crossed pivotally connected members provided with laterally offset gripping jaws at one end, a tooth-band material contracting member having a handle portion and a laterally offset head portion with an opening through which a doubled strip of tooth-band material gripped by the jaws of the pliers is adapted to extend, and means pivotally connecting said material contracting member intermediate its ends with the pliers to permit movement of the head portion thereof toward and from one side of the jaws of the pliers.

5. A dental appliance comprising a pair of pliers provided with cooperating offset gripping jaws, a reversible member having two strip-embracing portions through either of which a doubled strip of material held by the jaws may pass, and means for shiftably and detachably supporting said member on the

pliers with said strip-embracing portions at one side or the other of the jaws and one said embracing portions in position to receive a doubled strip of material gripped by the offset jaws of the pliers and contract the loop formed by said strip when the member is shifted in one direction.

6. A dental appliance comprising a pair of crossed pivotally connected handle members provided at one end with cooperating offset gripping jaws and formed with oppositely disposed sockets at the opposite side of their pivot point from the jaws, and a detachable and reversible auxiliary handle member provided intermediate its ends with a pivot pin adapted to engage in the socket in the crossed handle members, said auxiliary member being also provided with a head having oppositely extending portions parallel with the gripping jaws each of which is formed with a slot adapted to receive material gripped by the jaws in one position of the reversible auxiliary handle member.

7. A dental appliance comprising a pair of crossed pivotally connected handle members provided at one end with cooperating offset gripping jaws and formed with oppositely disposed sockets at the opposite side of their pivot point from the jaws, and a detachable and reversible auxiliary handle member provided intermediate its ends with a laterally offset pivot pin adapted to engage in the sockets in the crossed handle members, said auxiliary member being also provided with a head having oppositely extending portions parallel with the gripping jaws, each of which is formed with a slot adapted to receive a double strip of material gripped by the jaws in one position of the reversible auxiliary handle member, said slotted portions of the auxiliary member having concave outer tooth-engaging faces and means for locking the crossed handle members together to hold the jaws thereon in gripping relation with each other.

8. A reversible tooth-band material manipulating attachment for dental pliers comprising a lever having means held thereto intermediate its ends for detachably and pivotally supporting the lever on the pliers to swing about an axis at a right angle to the pivot of the members of the pliers, said lever having a handle portion at one side of its fulcrum and a head portion at the opposite side of its fulcrum, the head portion having two transverse slots extending inwardly from opposite edges thereof.

9. A reversible tooth band material manipulating attachment for dental pliers comprising a lever having means held thereto intermediate its ends for detachably and pivotally supporting the lever on the pliers to swing about an axis at a right angle to the pivot of the members of the pliers, said lever having two opposite disposed laterally projecting portions at one side of its fulcrum each of which is provided with a transverse slot, one side of each of said projecting portions being shaped to conform with a tooth surface.

10. A dental appliance comprising a pair of crossed pivotally connected lever members provided at one end with cooperating offset gripping jaws and formed with oppositely disposed sockets at the opposite side of their pivotal point from the jaws, a detachable and reversible auxiliary lever member, a pivot pin held to said auxiliary lever member intermediate the ends of said member adapted to engage in the sockets in the other lever members and formed with circumferential grooves adjacent opposite ends thereof, a locking screw

threaded into one of the crossed lever members the inner end of which is adapted to project into one of the grooves in the pivot pin in either position of the reversible lever member, and a pair of oppositely extending arms formed on the reversible lever member, each of which is provided with a slot adapted to receive material gripped by the jaws in one position of the reversible member.

11. A dental appliance comprising a pair of pivotally connected plier members having cooperating gripping jaws, a lever extending along one side of the plier members, a pivot pin held to said lever intermediate the ends of the lever and having a circumferential groove therein, one of said plier members being provided with a socket adapted to receive said pivot pin, and a locking screw threaded in the plier member provided with the socket and adapted to engage in the groove in the pivot pin, said lever having an opening therethrough at a point opposite the jaw of the plier member to which the lever is held.



## ABSTRACT OF CURRENT LITERATURE

Covering Such Subjects as

ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

**Foreign Bodies of Dental Origin in the Lungs and Esophagus.** C. F. Bowen (Columbus). *The Dental Summary*, July, 1922, xlii, 7.

As a rule the dentist is not responsible when dentures, etc., are aspirated or swallowed, but in theory such an accident might occur in the dentist's office while the patient is in the chair; in which case he would neither have the skill nor the apparatus to remove it promptly. In addition to the immediate reaction there would be the more remote contingency of abscess of the lung, etc. The author, who is a laryngologist, has removed 368 foreign bodies from the air passages with loss of but two patients, respectively from edema of the lungs and pneumonia.

The following case is of special interest to dentists. While one of the latter profession was fitting a bridge into the mouth of a male patient aged 51, the article slipped into the throat. The subject choked a little but experienced no further trouble. It was naturally assumed that the object had entered the stomach, but the stools were watched in vain for its appearance. It was further taken for granted that it had escaped by the bowel undetected. At this juncture the patient thought he had taken a severe cold and his family physician heard some unusual sound during auscultation. The episode of the swallowed bridge led to a diagnostic x-ray and the object was seen lying in the right bronchus. The author then extracted it.

**Bronchoscopic Cases of Dental Origin.** H. H. Forbes (New York). *New York Medical Journal and Medical Record*, June 21, 1922, cxv, 12.

The title of the paper is slightly misleading, as the reader might be led to infer that the accidents unquestionably occurred in the chair, and that the dentist was entirely responsible. Of five cases reported but one (or at most two) occurred with absolute certainty while the patient was in the hands of the dentist. In this case the patient, a man of 82, coughed while a crown was being fitted, and the object was dislodged into the right bronchus. The dentist at once thought that it had been aspirated and the x-ray located it in the right bronchus, from which the author extracted it. In the second case the accident occurred at night in the home of the patient, a por-

tion of a toothplate having been aspirated into a bronchus. In the third case a root of a tooth was coughed up by a patient who was under treatment for abscess of the lung. The aspiration may have taken place during some multiple extraction by a dentist, but as the patient had once before coughed up a piece of bone (which apparently was not preserved or even examined) the history must be regarded as too unsatisfactory for purposes of record. Apparently the x-ray noted further fragments, which in turn were expelled by coughing. In the fourth case some amalgam filling seems to have been aspirated during multiple extraction, and precisely the same accident occurred apparently in the fifth case. In the last two cases the extraction was made under general anesthesia, and as there were no symptoms before this event the inference is that the accident occurred in the dentist's office and during the extraction. In Case IV the dentist had no intimation that an accident might have occurred, but in Case V, in checking up after the extraction, the operator missed a filling. Hence it may be conceded that in Cases I and V the operator had some foreknowledge of the accident. In Case II the dentist is fully exculpated while Case III must remain doubtful.

**Fads in Dentistry.** F. R. Henshaw (Indianapolis). *The Dental Summary*, June, 1922, xlii, 6.

In an article entitled "Rationalism and Radicalism" the author briefly sums up the innovations of dentistry which have been abused to such an extent as partly to merit the term "fad." Of these the first was the epidemic of crown and bridge-work of the early 90's. To keep pace with the fad much sloppy and actually dishonest work was required which culminated in a reaction that almost threatened the existence of fixed bridge-work. In the end a compromise was reached. The many-toothed fixed bridge had to go, but the removable bridge will also have its day of trouble before a balance can be struck. Next to this fad came the porcelain craze because of its cosmetic appeal. The fallacy of porcelain lies in the fact that a relatively small number of dentists possess the technical skill required for satisfactory results, an objection which long held good for bridge-work as well. The third craze was root canal filling before crowning, and immediately following this and antagonistic to it came the dental radiogram and the propaganda of focal infection. The reaction to overconservatism in filling led to an epidemic of extraction and the introduction of surgical exodontia. We are now in the midst of this craze and its counter craze, for every abuse in dentistry calls forth its reactionaries and breeds disharmony in the profession. We are at present in a quandary, for while scores of obscure cases of disease have been cured by removal of oral foci of infection, thousands of useful teeth have been unnecessarily extracted without benefit to the patients.

**Teeth in Relation to Diseases of the Eye.** D. W. Wells (Boston). *The Dental Surgeon*, September 8, 1922, xix, No. 932.

The author first saw a case of infection of the eye from oral sepsis in 1901. An unsuccessful attempt at extracting a carious tooth in a 12-year-old

boy had lighted up this infection. In this case the infection had first involved the antrum, soon setting up orbital cellulitis. There was an embolism of the central artery of the retina with permanent loss of vision on that side. Drainage of the orbital and antral cavities led to recovery. The antrum had apparently been the seat of a chronic infection. An analysis of 90 cases of iritis and iridocyclitis has shown that about one in five was due to infection from the teeth and tonsils. When injuries of the eye lead to severe infection it may be found that dental mischief of some sort pre-existed.

In cataract operation and surgical intervention in the eye in general, there is a certain percentage of infection which would doubtless be reduced to a minimum if all focal lesions were remedied before operation. The lacrimal sac was formerly blamed for numerous postoperative infections now known to be due to infected teeth and tonsils.

The modern ophthalmic surgeon will seldom operate on the eye until the teeth have been radiographed and the tonsils removed. In one case of cataract extraction in which a preliminary iridectomy was followed by infection, the cataract was removed without accident after extraction of some infected teeth.

**Some Chemical Problems as Applied to Dentistry.** A. K. Epstein (Chicago, Ill.). *The Dental Cosmos*, June 22, 1922, lxiv, p. 637.

The author, who is a biochemist, limits his paper to two widely differing aspects of chemistry as applied to dentistry—the chemistry of commercial mouth preparations and the effects of diet on the teeth. Of the nine elements necessary to sustain life no less than seven are found in the saliva. Of interest is the normal reaction of the latter, which, while alkaline to test paper may be found acid to phenolphthalein. Something aside from mere indicators must be used to determine the reaction and hence of late years the hydrogen-ion concentration has been employed. A certain concentration is neutral and anything below this counts as alkaline while if the concentration is in excess of this point the saliva is said to be acid. The reagents usually employed as indicators themselves affect the acidity or alkalinity, while the substances admixed with the saliva, known as “buffers,” also interfere with obtaining the reaction. The hydrogen-ion concentration is sensitive to changes in the blood and exhaled air and at a certain point the calcium salts are precipitated and form the tartar. This may if not marked be removed mechanically. In higher degrees it may be shown that both alkalies and acids may aid in solution, each class dissolving some ingredient; it may also be shown that either class can injure the teeth, so that the problem of cleanliness is a very complicated one. The propaganda of tooth paste manufacturers is often far-fetched, if not actually inimical to the teeth.

In discussing vitamins the author calls attention to the recent discoveries of McCollum that one of these bodies, evidently distinct from the three known vitamins, is necessary for calcium metabolism.



**Teeth, Tonsils and Toxemias of the Intestinal Tract in Relation to Diseases of the Eye.** G. H. Bell (New York). *The Journal of Oralogy*, June, 1922, i, 1.

The author has been writing on this subject since 1910 and believes that if the practitioner always keeps in mind the "Three T's" he will avoid much diagnostic confusion. The subject cannot be broken up any further, for when there is mischief in one of these localities the other two are apt to be compromised. Oral sepsis is the arch enemy of the ophthalmic surgeon, and before he operates he does, or certainly should, exclude the possibility of focal infection, which might negative the results of intervention on the eye. The trouble is apt to begin in childhood with an unbalanced diet in which there is excess of carbohydrate and especially of sugar. In adult life women continue this error of childhood. Next of course comes infective hygiene of the teeth. Infections of the teeth would not occur—and this is true of any focal infection—if there were not already present a toxemia of the acidosis type. The author mentions the comparatively new dogma that opposite types of food should not enter into the same meal. Protein foods should compose one meal and carbohydrates another, but they should not be combined in the same meal. Either proteins or carbohydrates may be combined with vegetables and fruits, for these contain but a small fraction either of protein or carbohydrate. The author might have added that rapidly digestive foods should not be combined with those of slow digestion. Practically nothing is said of the eye itself save that focal infection frequently causes keratitis, iritis, choroiditis and retinitis.

**Mental Therapeutics and Modern Dentistry.** J. W. Dorland (Pasadena). *The Dental Cosmos*, June 22, 1922, lxiv, p. 640.

This subject has been almost wholly ignored in dental literature with the exception of certain aspects, as hypnotism as a remedy for pain. That toothache subsides as a result of autosuggestion is of course one of the pioneer facts in the practice of dentistry. Apparently as a defense reaction inspired by fear of more pain the toothache subsides often as the patient reaches the dentist's office. The author cites the case of an Italian dentist of a by-gone age who cured toothache by autosuggestion, causing the patient to crush a certain insect in his fingers after having told him that this act was a sure cure. This method was effective in about two-thirds of his cases. The personality of the dentist, rather than his prestige in the community, often determines the choice in the patient's mind. The fact that some practitioners seem less painful than others may be due at times to the patient and his imagination. It is evident that the dentist who can handle the neurotic subject and the child better than his neighbor does not owe his superiority necessarily to a lighter touch for some other factor must be present. The dentist who merely consults the sensations of his patient is certain to produce a defective result and it should be possible for the operator, by skilful diversion of the patient's attention and other simple devices, to diminish pain at critical moments.



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## EDITORIALS

### A Plea for More Intelligent Use of the Soldered Lingual Alignment Wire

IN a paper entitled "Methods of Orthodontic Treatment" by Dr. James T. Quintero, we find he reviews some of the leading types of appliances that have made their appearance during the last few years. One paragraph of the paper relative to the soldered lingual arch deserves careful consideration and comment. The following paragraph is taken from his paper:

"It is several years now since Lourie first used the lingual arch, not merely as a passive appliance to act as a retainer after the results have been obtained, for that was the purpose of the use for many years, but he makes it the active agent in the treatment. He also uses it in combination with a labial arch which passes quite high up on the gums and has vertical projections which pass downward and rest upon the crowns of the teeth. Then again at other times he uses the lingual arch alone. This process is excellent in all points but one and that is that the arch is soldered to the anchor bands.

Thus, the appliance is absolutely stationary and all the adjusting has to be made in the mouth. Consequently the operator works blindly without knowing whether the way in which he used the pliers on it will produce the desired effect. But, as regards simplicity, upon comparing it with Angle's appliance, it shows so many advantages over it that it seems the operator ought not to hesitate a moment about using it and seeing that in this appliance, the very "ne plus ultra" of simplicity has been attained. Indeed, what can be simpler than having the anchor bands and the arch forming one piece which is strong and cannot be easily bent out of shape."

The thing that we particularly desire to call to the reader's attention is this statement: "The appliance is absolutely stationary and all the adjusting has to be made in the mouth. Consequently the operator works blindly without knowing whether the way in which he used the pliers on it, will produce the desired effect." We agree with the first part of his statement that the appliance is absolutely stationary and must be adjusted in the mouth, but the latter statement we would qualify by saying that *some* operators work blindly without knowing whether the way they adjust the soldered lingual alignment wire will produce the desired effect.

We believe that no style of regulating appliance that has been designed within recent years possesses advantages that can be obtained by the use of the soldered lingual alignment wire, as introduced by Dr. Lourie provided his technic is followed. The reason some men work blindly with that appliance is that they have never mastered wire bending or the principles of wire stretching as Dr. Lourie has always insisted upon their doing.

The soldered lingual alignment wire is a wonderful asset to the orthodontic treatment, but it also becomes a very dangerous apparatus if used by one who does not understand the principles upon which it is constructed or the various changes produced in making bends or stretching the wire.

Several years\* ago an article appeared in the Journal dealing with wire bending technic which described some of the movements that could be produced with the soldered lingual alignment wire. That article was reviewed by Dr. Lourie before it was published and everything mentioned in the article was according to his methods of treatment at that time, and which plans had been and are still followed by the author.

Nevertheless in spite of that explicit description of the use of the soldered lingual alignment wire and changes which can be produced by bending the wire and pinching it, men have, as Dr. Quintero states, been working "blindly" without the knowledge of whether the way they use the pliers and soldered lingual alignment wire will produce the desired effect. We have known of cases where men have seen the results accomplished by the proper use of the soldered lingual alignment wire and have constructed and placed that appliance in the mouth of a patient without being familiar with the technic.

We have seen cases in which the appliance has been worn for months without any change being produced in the malposed teeth because the operator did not know how to produce the desired changes. In some instances

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\*International Journal of Orthodontia, July, 1918.

such a man has abandoned the appliance as being useless, which probably is the safest thing for the patient in such instances. In other cases the appliance has been inserted and subjected to pinchings and bendings which have produced undesirable changes in the dental apparatus because the operator did not know what to expect when he made a certain pinch or bend.

Dr. Quintero's analysis of the appliance is very accurate. It is one of the simplest devices that has ever been employed and one which, because of this simplicity has allowed a great many men to get into trouble and produce unsatisfactory results. The appliance has so many advantages that we believe one who has not mastered the use of the soldered lingual alignment wire is allowing one of the most valuable forms of regulating appliance to be unused.

There are certain types of malocclusion which we believe can be more successfully treated by a soldered lingual alignment wire than any other style of appliance regardless of how complicated the other appliance may be. However, with all these advantages of inconspicuousness and simplicity we still insist that great care must be exercised in its use or actual harm will result.

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#### Electro-Radiographic Diagnosis\*

WITH the perfection of radiographic technic, it becomes necessary that the dental profession be able to make a diagnosis of the vitality of teeth with greater accuracy than was possible in former years. With a good radiogram, it is very easy to detect infection of teeth where it has progressed to a certain degree. However, in early pulp involvements where the question of vitality is of importance, the radiogram does not give the desired information. It is in these cases that the electric test for pulp vitality is of value. In fact, if the electric test is properly used, there is no other method that will give quite the same results.

While this plan of diagnosis has been employed by some men in the profession for a number of years, it remained for Dr. Howard R. Raper to prepare a monograph on the subject which gives information that had never before been collected in the pages of one book. Dr. Raper reviews the various styles of pulp testing machines, giving the advantages and disadvantages of each type in such a way as to show that he is speaking from a scientific viewpoint and not personal bias. He carefully describes the technic of making an electric test and calls special attention to the difficulties which may be encountered with various kinds of teeth. To any one who is interested in the vitality tests for teeth, we recommend this book as giving more information than he can find elsewhere. To those who have attempted the electric test and have found it unsatisfactory, we suggest that they carefully check up their technic according to the plan outlined by Dr. Raper, and it is very probable that they will locate their difficulties. The book is clearly and concisely written along the lines followed by Dr. Raper in his other writings. It contains 135 original illustrations.

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\*"Electro-radiographic Diagnosis," By Howard R. Raper, C. V. Mosby Co., St. Louis, Mo.

### British Society for the Study of Orthodontics

THE transactions of the British Society for the Study of Orthodontics for the year of 1921, as published for the Society by the Dental Manufacturing Company, is a very interesting volume. It is printed in clear type and a number of illustrations are made on special glazed paper in such a manner as to bring out the halftones very nicely.

The book contains six original communications and seven large contributions by members of the Society. Probably one of the most interesting articles is the communication by Sir Arthur Keith and George G. Campion entitled "A Contribution of the Mechanical Growth of the Human Face." This article is very well written, but some of the ideas expressed in regard to the mandible and the maxilla are not exactly in accord with some of the opinions held by other men. We especially believe that the illustrations, when viewed by themselves, are rather misleading, even if they do not exactly express the ideas of the authors.

Some of the papers read before the British Society for the Study of Orthodontics have been published in THE INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND RADIOGRAPHY, and the other communications of the Society will be published in the early issues of the Journal.

The British Society is to be complimented upon the type of papers presented before it and the Dental Manufacturing Company deserves credit for the neat manner in which the transactions have been published.

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### A Letter From Dr. Case

To the Editor of THE INTERNATIONAL JOURNAL OF ORTHODONTIA, ORAL SURGERY AND DENTAL RADIOGRAPHY:

IN THE *Dental Items of Interest* for September, 1922, under the head of Editorial Reviews, the writer (B. W. W.) in a supposedly fair review of my book, "Dental Orthopedia and Prosthetic Correction of Cleft Palate," makes the following statement: "Unfortunately at times he (the author) contradicts himself with diametrically opposite statements as though not quite sure of himself."

I have asked the Editor of the Items to require his reviewer to fully outline the places in my book that justified this statement.

If it is true, all students of my system of orthodontia should know exactly what it refers to so as to avoid falling into an error, and I shall be the first to acknowledge and do what I can to correct it.

If it is not true, let the author of it stand forth before the dental profession as a falsifier and slanderer without cause or justification.

Respectfully,

(Signed) Calvin C. Case.

Sept. 26, 1922.



## ORTHODONTIC NEWS AND NOTES

### American Institute of Dental Teachers

The Thirtieth Annual Meeting of the American Institute of Dental Teachers will be held at Creighton University, Omaha, Nebraska, Hotel Fontenelle, headquarters, January 22, 23, 24 and 25, 1923.

A cordial invitation is extended to all persons interested in dental teaching. A. H. Hipple, President. Abram Hoffman, Secretary, 381 Linwood Ave., Buffalo, N. Y.

### The Eighth Annual Meeting of the European Orthodontia Society Was Held in London, July 26 and 27, 1922

This was the first meeting of the European Society held since 1914. The Society was organized in 1907. The following scientific program was carried out:

#### 10 o'clock: OPENING OF THE GENERAL MEETING.

Dr. G. Lind, of Amsterdam, Presidential address.

Dr. C. A. Hawley, of Washington, U. S. A.

The Principles and Art of Retention.

Dr. C. Johnson, of Helsingfors, Finland.

Some Cases of Traumatic Lesion of the Deciduous Denture and its Bearing on the Permanent Jaws and Teeth.

Dr. V. Andresen, of Copenhagen, Denmark.

Functional Treatment of Open Bite.

#### 1 o'clock: LUNCHEON—Given by the London Local Committee.

2:30 o'clock: Dr. William C. Fisher, New York, U. S. A.

Some Variations in the Development of the Lingual Arch.

Dr. C. d'Alise, of Naples, Italy.

Syphilis, Tuberculous et Malocclusion.

Dr. G. Lind, of Amsterdam, Holland.

Remineralization of Teeth.

Dr. S. Dreyfus, of Lausanne, Switzerland.

De l'influence du mode d'allaitement chez les nourrissons sur le développement du maxillaire superieur.

Dr. A. Kadner, of Hamburg, Germany.

Etiology of the Anomalies of the Teeth and a New and Simplified Method of Treatment of the Basis of the Knowledge of Etiology.

*Thursday, July 27th, 1922.*

9:30 o'clock: Dr. F. L. Stanton, of New York, U. S. A.

On the Application of Mathematics to Orthodontics.

Synopsis: An Orthographic mapping instrument; Orthographic maps of normal occlusion; Orthographic maps of malocclusion; The oclusograph an instrument for determining normal occlusion; Orthographic maps of occlusion as determined by the use of the oclusograph; A method of relating the map of occlusion to show the least tooth movement (theory of "least squares"). Dr. F. L. Stanton will be assisted by Dr. Juan Manes, of Madrid, Spain.

Dr. C. Johanson, of Helsingfors, Finland.  
Two Corrected Cases of Impacted Teeth.  
Dr. A. L. Hipwell, of Paris, France.  
Impacted Teeth Restored to Normal Occlusion, with Practical Cases Showing Results.

1:00 o'clock: LUNCHEON.

2:30 o'clock: CLINICS:

Dr. C. d'Alise, of Naples, Italy.  
Revetement en caoutchouc de l'arc d'expansion.  
Dr. S. Dreyfus, of Lausanne, Switzerland.  
Le diagnostic en orthodontie le diagnosticope.

Dr. William C. Fisher, New York, U. S. A.  
Lingual Appliances.  
Dr. C. A. Hawley, Washington, U. S. A.  
Manipulation of the Ribbon Arch.  
Dr. E. Herbst, Bremen, Germany.  
Some Novelties in Orthodontics.  
Dr. J. T. Quintero, Lyon, France.  
Sweating Bands for Orthodontia.  
Dr. C. W. Roberts, London, England.  
Porter Attachment for Lingual Arch.

5:00 o'clock: BUSINESS MEETING (For members only).

Admission of new members—Amendments to Constitution and By-Laws—Election of Officers and Censors.

### New York Society of Orthodontists

A meeting of the New York Society of Orthodontists was held at the Hotel Vanderbilt on Wednesday, October 11th. The following program was carried out:

2:30 P. M. CLINICS:

Taking Plaster Impressions.  
James C. Allen, New York, N. Y.  
Making and Fitting Plain Bands Directly to Molar Teeth.  
C. Sterling Conover, New York, N. Y.

4:00 P. M. Discussion of Clinics.

4:15 P. M. Case Reports:

"A Case of Premature Development on One Side of a Dental Arch."  
Herbert A. Pullen, Buffalo, N. Y.  
"Half-Buccal Alignment Wire in Combination with Lingual Arch Wire, Showing Case Treated." William C. Fisher, New York, N. Y.  
Reports on Three Cases of Varying Types. Harry Dean, New York, N. Y.

4:45 P. M. Discussion on Case Reports.

5:00 P. M. Paper.

"A New Method of Diagnosis for Orthodontic Cases." Alexander Sved, New York, N. Y.  
Discussion: Opened by Gilbert D. Fish, C. E., New York, N. Y.

6:30 P. M. Dinner Served in Private Suite.

8:00 P. M. "A Review of Recent Papers by Sir Arthur Keith and Professor Bolk on the Mechanisms of Growth and Racial Differentiation." Professor William K. Gregory, Assistant Professor of Vertebrate Paleontology, Columbia University.

The next meeting of the New York Society of Orthodontists will be held on Wednesday afternoon and evening, December 13, at the Hotel Vanderbilt, New York City. All ethical members interested in the practice of the specialty of orthodontia are invited to attend.—William C. Fisher, Secretary.

**Proceedings of American Society of Orthodontists**

Dr. Wm. Fisher desires copies of the Proceedings of the first, third, fifth, twelfth, and seventeenth annual meetings of the American Society of Orthodontists. If any member has a duplicate copy of any of these volumes, please communicate with Dr. William Fisher, 501 Fifth Ave., New York City.

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**Montana State Dental Board Examinations**

The Montana State Dental Board will hold its semi-annual examinations the second Monday in January, 1923, at Helena, Montana.

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**Notes of Interest**

Dr. D. F. Keel wishes to announce to the profession the opening of offices for the exclusive practice of orthodontia, Reaves Infirmary, Greensboro, North Carolina.

Dr. James M. Mullen announces the opening of an office at 6008-6009 Jenkins Arcade, Pittsburgh, Pa. Practice limited to orthodontia.

Dr. Fred A. Hager announces that his practice is limited to orthodontia and radiodontia, 503 Main Street, Johnstown, Pa.

Dr. Herbert A. Pullen announces the association of Dr. Clifford G. Glaser in the practice of orthodontia exclusively, 131 Allen Street, Buffalo, N. Y.